

The Only Journal With a Paid Circulation in the Rock Products Industry

Rock Products

Vol. XXIV, No. 8

CHICAGO

April 9, 1921

EDITORIAL DEPARTMENT—

Nathan C. Rockwood, Editor
Chas. A. Breskin, Assistant Editor
L. R. Croy, Assistant Editor

ADVERTISING STAFF—

Charles H. Fuller, Eastern Manager,
101 West 41st Street, New York City

G. J. Nelson
A. S. Barnett
Western Representatives

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ROCK PRODUCTS—

Geo. P. Miller, Manager
E. M. Gibson, Assistant Manager

Published every other Saturday by

TRADEPRESS PUBLISHING CORP.
542 South Dearborn Street, Chicago, Ill.

W. D. Callender, President.
N. C. Rockwood, Vice-President.
Geo. P. Miller, Treasurer.
C. O. Nelson, Secretary.

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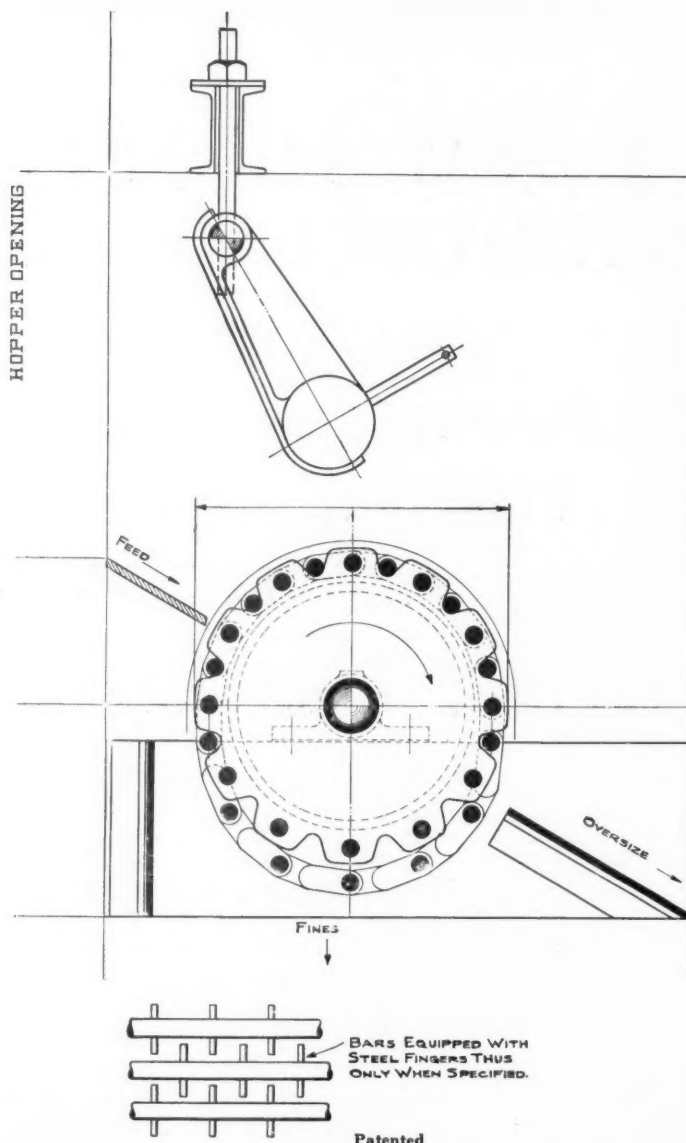
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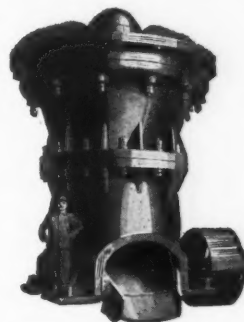
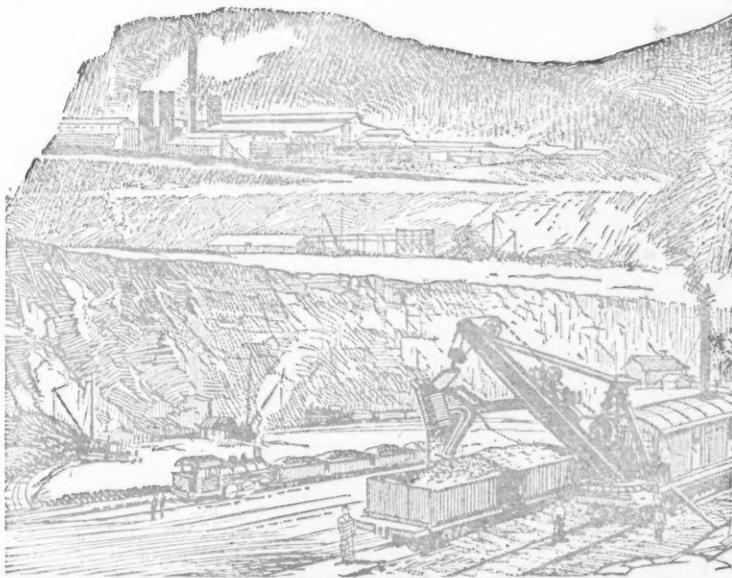
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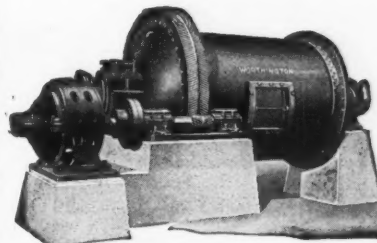
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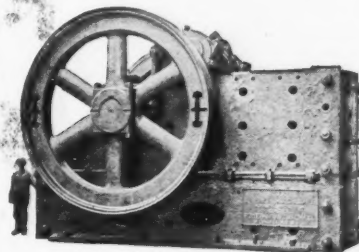
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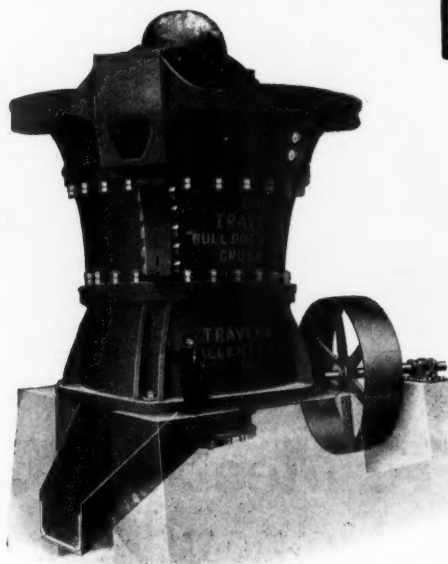
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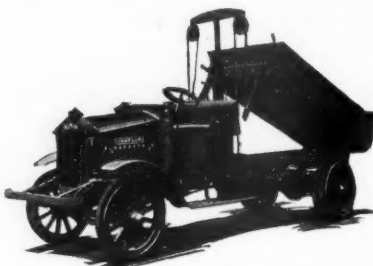
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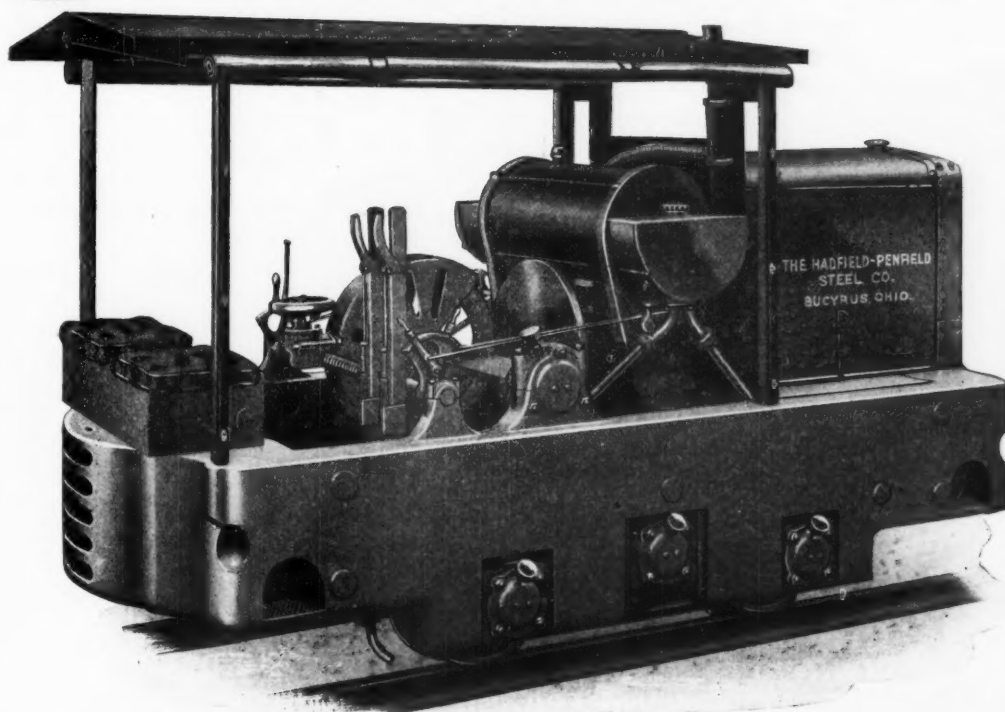
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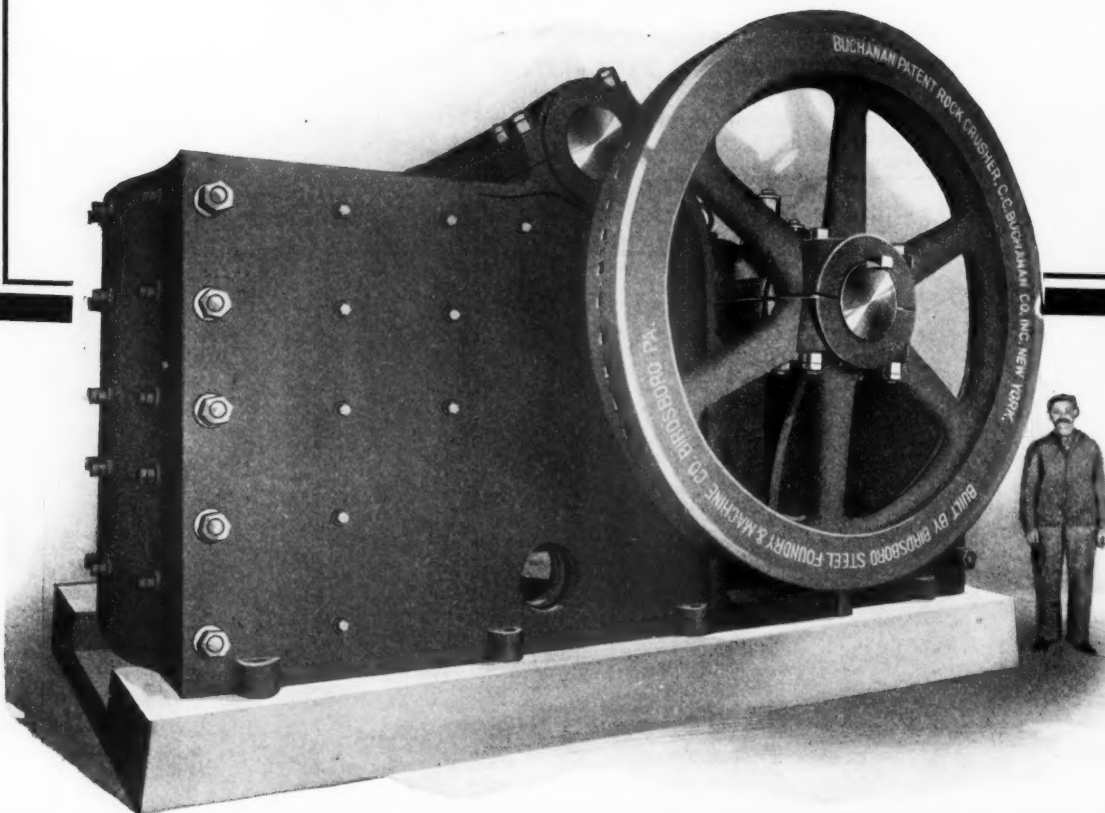
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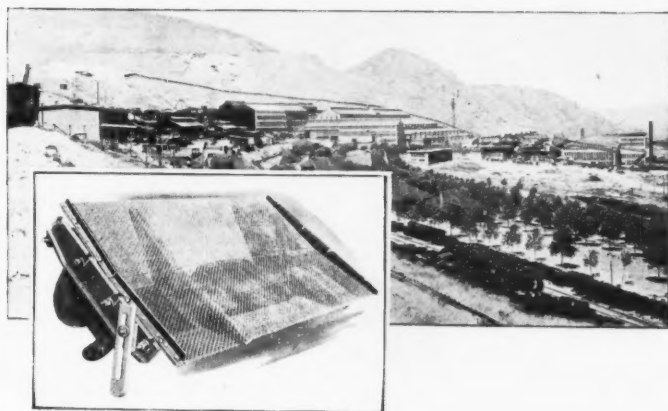
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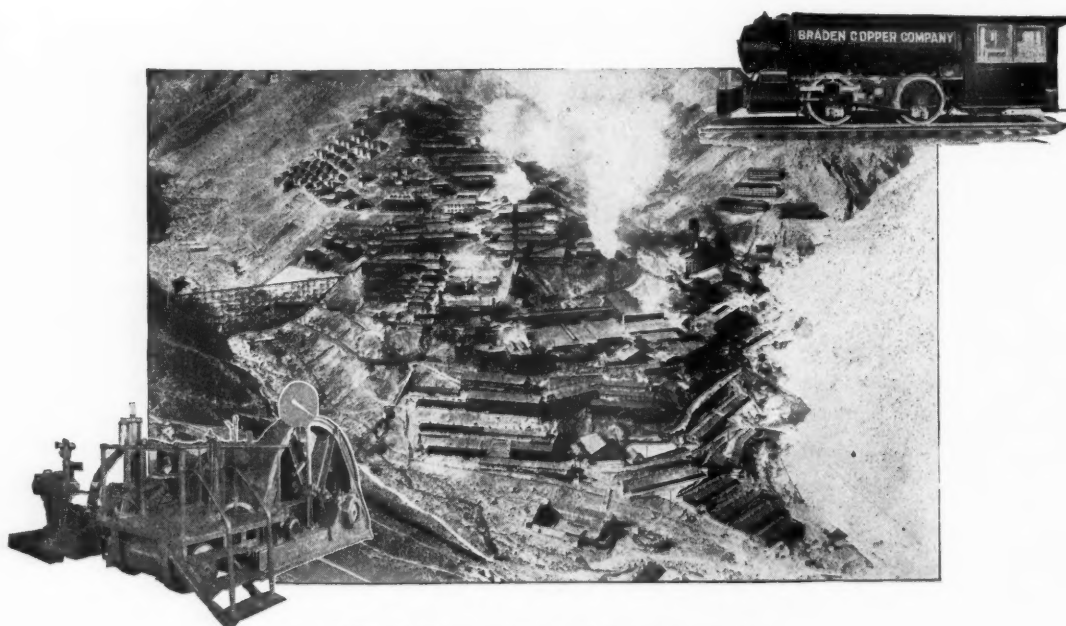
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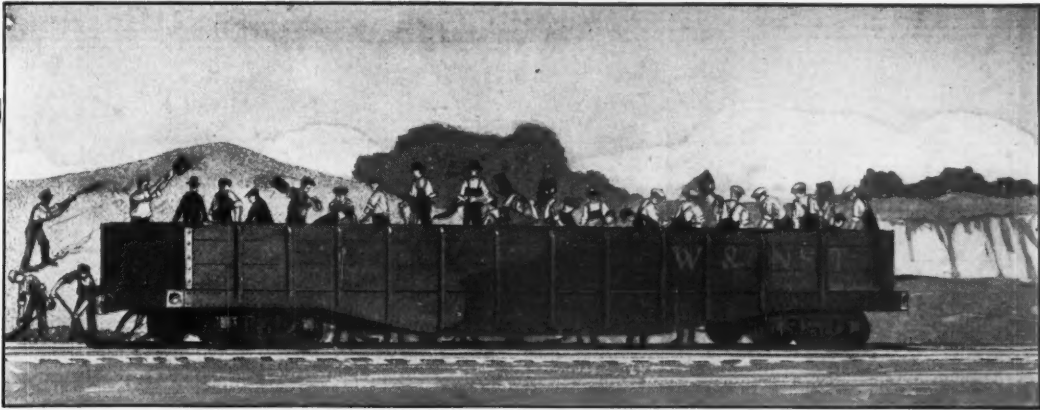
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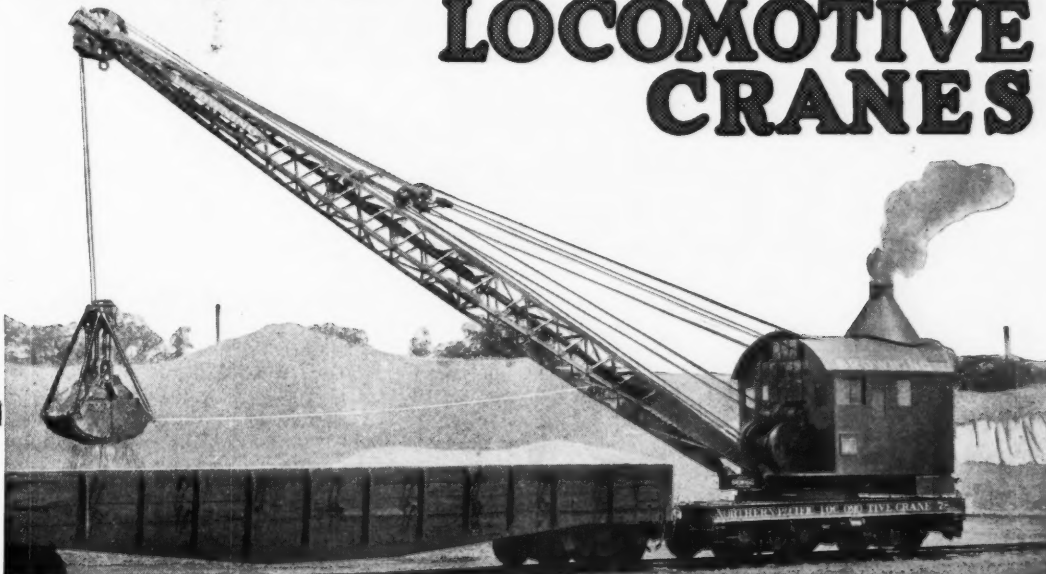
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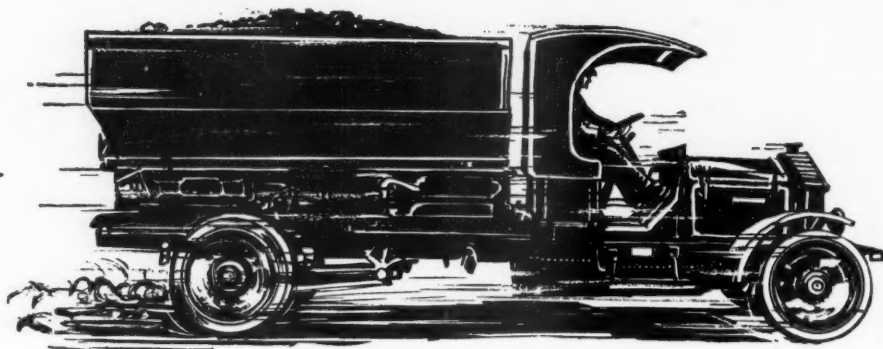
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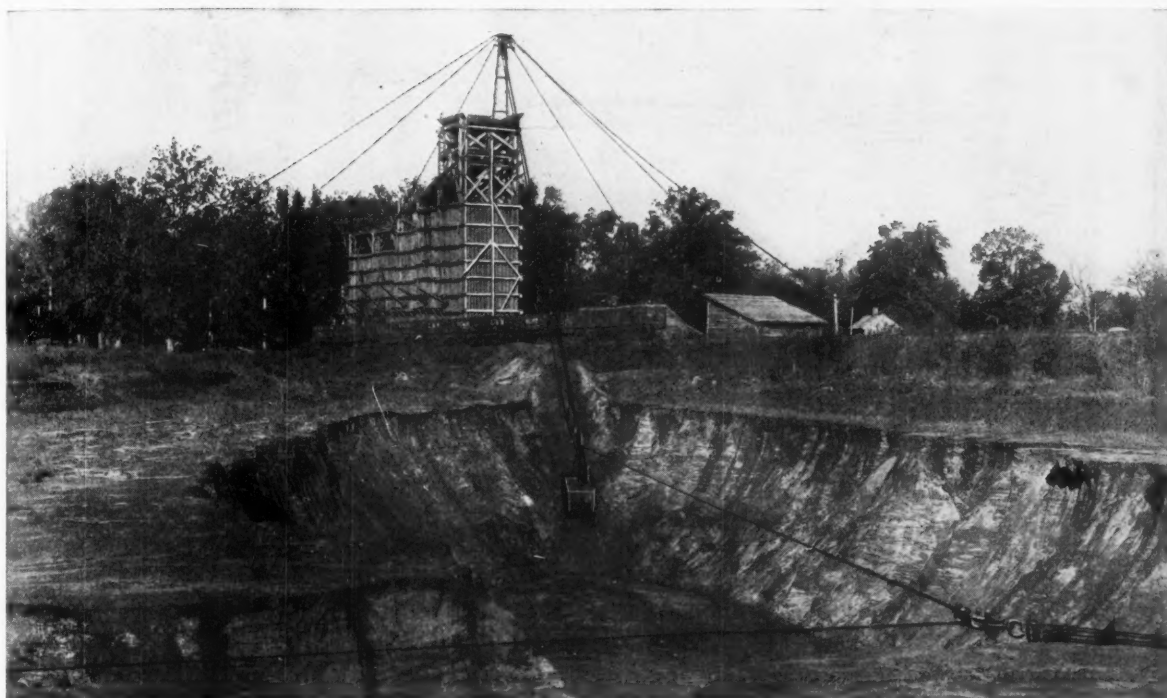
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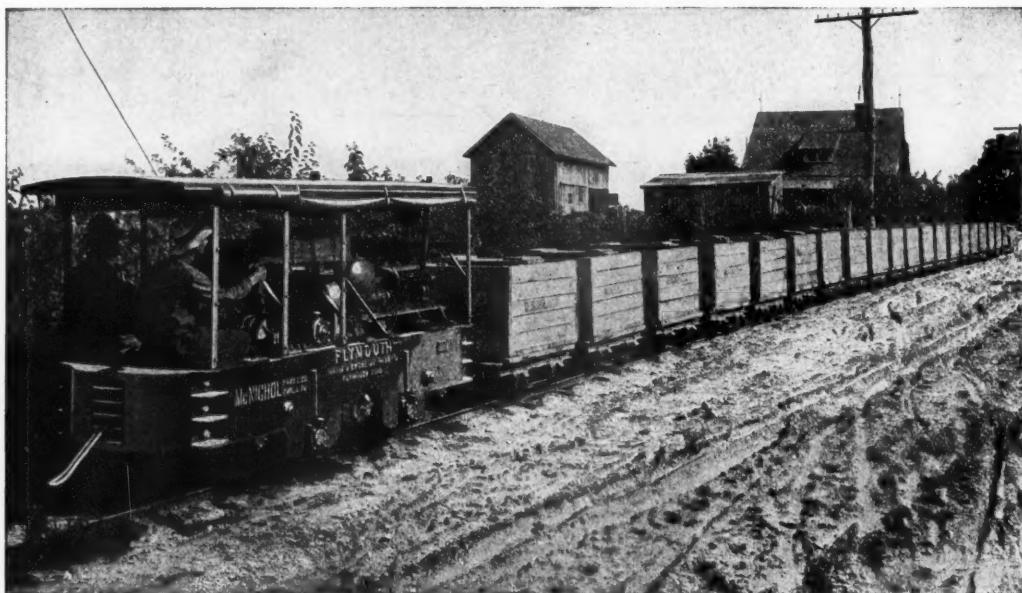
INDIANAPOLIS

San Francisco . . . 168 Second St.
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073

When writing advertisers please mention ROCK PRODUCTS

PLYMOUTH



Showing a 6-Ton Plymouth Locomotive as a Part of the Equipment of The McNichol Paving & Construction Co.

Plymouth Hauls Twenty-Car Train

The above illustration shows one of three 6-ton Plymouth Locomotives working on a 14-mile stretch of cement roadway, sixteen feet wide, at Greenwood, Delaware.

The Plymouth served by hauling twenty cars a distance of four miles, each car loaded with a one yard batch. In this haul it was necessary to negotiate a 3 per cent grade.

Mr. McNichol was highly elated with the service rendered by the Plymouth Locomotives, and expressed satisfaction for having bought his haulage units where the experimental stage had long ago been completed. Hence, real service, no repairs, no delays, slight up-keep expense, and profits commensurate. That's the kind of a haulage unit. Ask for Special Road Bulletin.

The Fate-Root-Heath Company Plymouth, Ohio

PLYMOUTH

Gasoline Locomotives

Rock Products

Vol. XXIV

Chicago, April 9, 1921

No. 8

Lime Stucco Not a Lost Art!

Some of the Finest Examples of Stucco Buildings in Ancient or Modern Times Are Being Built Every Day in Los Angeles and San Francisco—
Wet Mortar Plants—Blue Diamond Plaster Co.

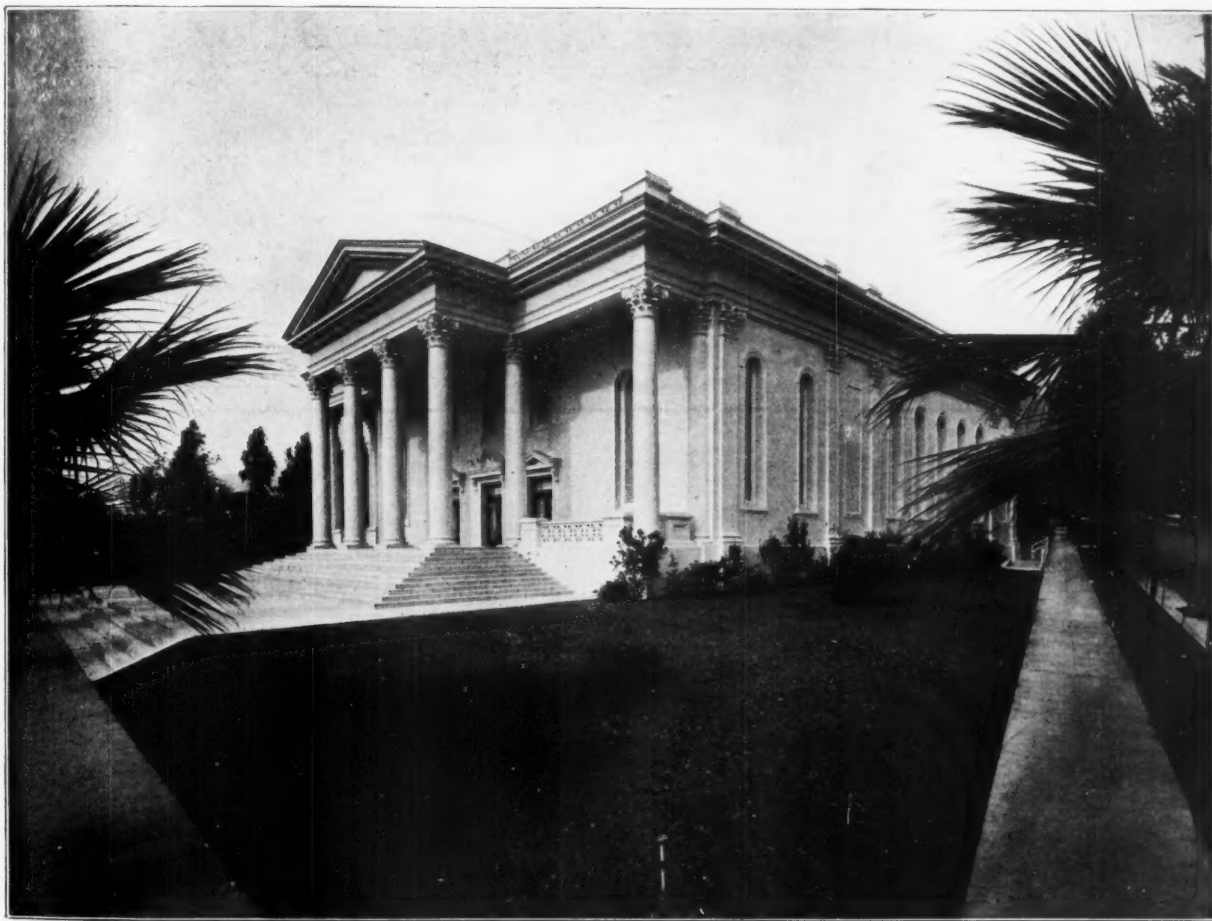
BACK IN APRIL, 1916, just five years ago, one William C. Hay, of San Francisco, Calif., appeared at the annual convention of the National Lime Manufacturers' Association and read a paper entitled, "How Lime Can Be Re-established in the Plaster Field."

At that time Mr. Hay was a more or less unknown quantity. He was even

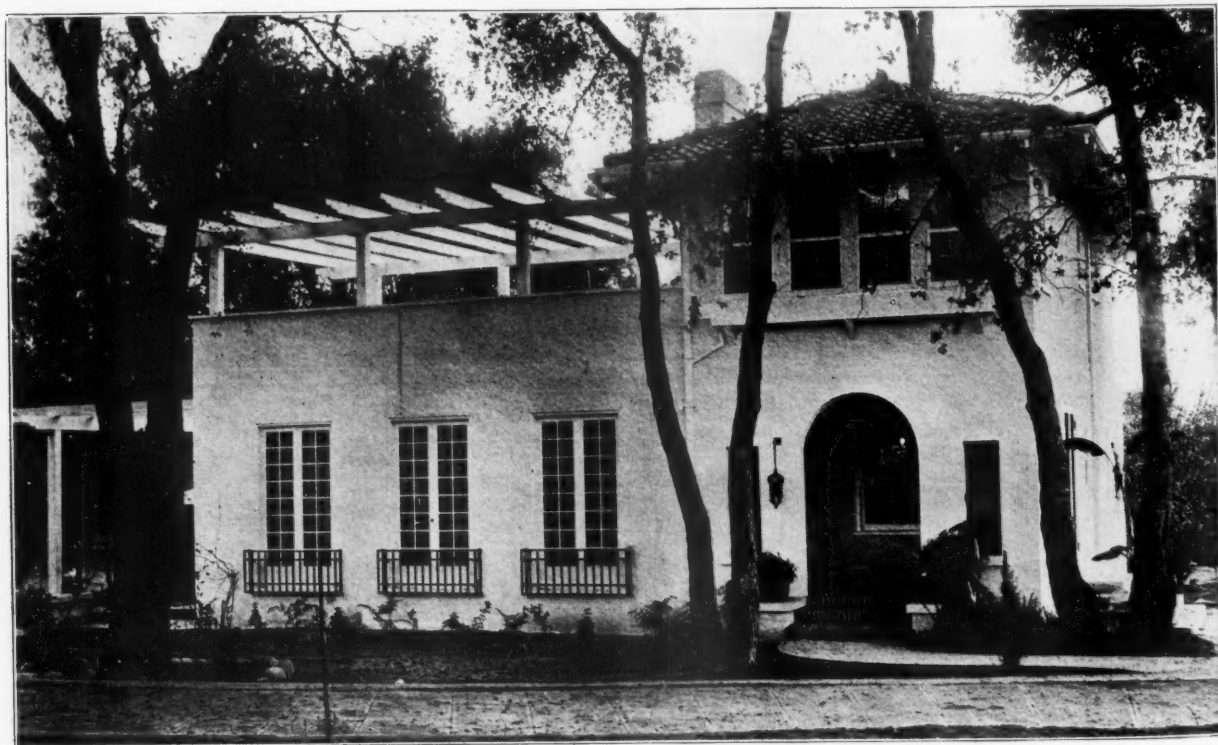
then having great success against tremendous odds in re-establishing lime in the building industry of San Francisco, but New York, where he read his paper, and San Francisco are a continent apart; and eastern men, be they lime manufacturers or distillers, are proverbially conservative and skeptical, particularly of anything that comes out of the West.

Mr. Hay went right on making his San Francisco plant a success in spite of war conditions, and at the same time started in operation the Blue Diamond Plaster Co., of Los Angeles, which has become the largest general building material producer on the West Coast and one of the largest in the United States.

The Blue Diamond Plaster Co. owns

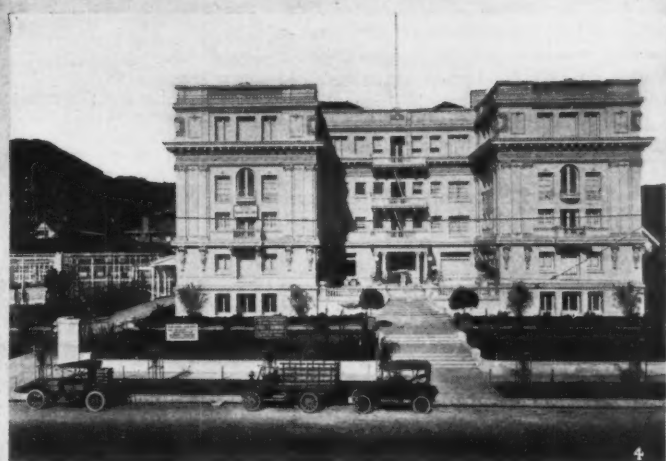
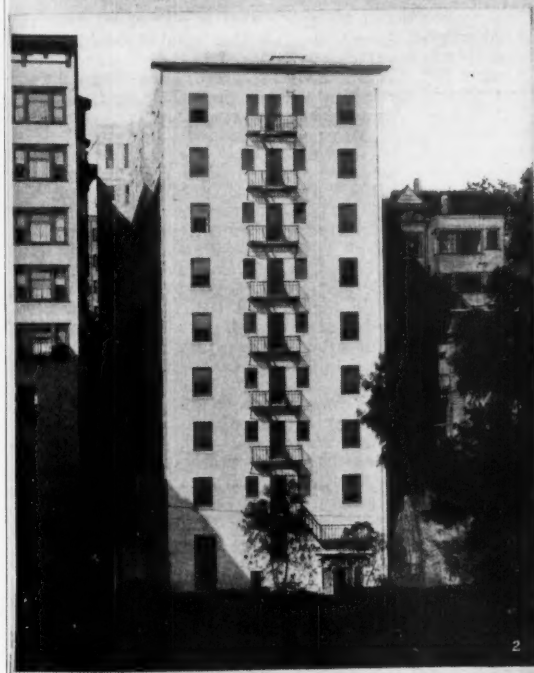


Can the ancients beat this in architecture, execution and workmanship?



Two quite different examples of lime stucco work

Some Various Examples of Ready-Mixed Lime Mortar Stucco and Plaster in Los Angeles and San Francisco, California



1. Frame church—Wood lath inside, metal lath outside, lime mortar and 200 lbs. of Keene's cement inside, lime mortar and 200 lbs. of portland cement outside; job located 4 miles from mortar plant.
2. Reinforced concrete building—Metal lath, solid partitions inside, lime mortar and 200 lbs. of Keene's cement; job 3 miles from mortar plant.
3. Typical high-class residential job. } Both these are in Los Angeles.
4. High-class apartment house job. }
5. Frame flat building—Wood lath inside and wood lath and poultry netting outside, lime mortar and 200 lbs. of Keene's cement inside, lime mortar and 200 lbs. of portland cement outside; 5 miles from plant.

and operates the largest crushed stone quarry plant on the West Coast (the Temescal Rock Co., see Rock Products, September 25, 1920), one of the principal sand and gravel plants in Los Angeles, a large lime plant at Summit, Calif., a gypsum mill at Arrowhead, Nev., a hydrated lime plant, a mortar plant and a mixed plaster plant at Los Angeles. This company's fleet of white motor trucks with their "blue diamond" trade-mark is one of the sights of the city. All this grew from a wet lime-mortar business.

Lime Has Unquestioned Merits, But Other Ingredients Help

Too frequently the producer of a single building material will never admit that the addition of something he personally cannot supply is of any advantage to his product. We see an illustration of this in the case of the portland cement manufacturer and the use of hydrated lime. We see another illustration in the case of the gypsum producer and hydrated lime, and in the case of the lime producer and these other two commodities. There are a good many unbiased engineers who believe that the addition of hydrated lime greatly improves the workability of concrete; there are not a few plaster experts who believe gypsum plaster is much improved by the addition of hydrated lime; but, the producers of these materials almost invariably insist on "unadulterated" goods.

Mr. Hay tackled this problem with an open mind. Speaking of the advantages of gypsum plaster over lime plaster, he said, in his paper read in 1916:

Gypsum plaster is quicker and more convenient to mix into mortar for use. The resultant plaster is free of possible wall blisters or pops. The building can be finished sooner, owing to its rapid set. The finished walls are harder and consequently more serviceable and the completed work costs no more than if lime had been used.

If you grant that these are the salient reasons, responsible for the tremendous gypsum growth, all will agree that if lime mortars could present the same advantages lime would speedily return to its former supremacy in the plaster field, because in such a lime mortar would be combined all the economic and technical qualities that could be desired in an ideal plaster.

Since we know that straight lime mortar or plaster does not measure up to the requirements, it is apparent that to obtain the desired results some other factor or agent must be added with the lime. Experiments along such lines have been conducted for several years by lime manufacturers, engineers and others, and from time to time there have been presented lime mortars, gauged with a cement or hardening agent of various chemical base. Taken as a whole these mortars or plasters have not established any substantial trade and it cannot be seen that they ever will until some of their objectionable features have been corrected. Of all those presented the mortar that seems to combine the most generally desired qualities contains a matrix of thoroughly slaked or

"THE FIRST ESSENTIAL
step towards real success is to get interested in producing something which others need, whether it be a good product or good service." Or both.—Monthly advertising folder of the Blue Diamond Plaster Co.

hydrated lime and Keene's cement. Such a plaster will not pop, it will make a hard wall, and will prove a superior plaster in every way. The many technical advantages of this, over all other known plasters have been recognized by most of the leading architects, and yet in the face of such strong endorsement this plaster remains a negligible factor from a tonnage standpoint. This has resulted chiefly from its high cost, besides it has been less convenient to prepare than gypsum mortar and in its use with most hydrates the mortar has worked short or stiff under the trowel.

Cost is by far the greatest item in determining the popularity of almost every building material staple, irrespective of what nice sounding arguments may be advanced to the contrary. Taken as a whole, the building trade never has, and it is not reasonable to suppose it ever will, pay extra for quality, when it exceeds an accepted standard; and since gypsum plasters maintain a standard that has proven apparently satisfactory for general work, it is obvious that we cannot hope to win back the trade until we can give the builder a lime mortar or plaster that will not cost more than gypsum—that will be easy to prepare—that will work smooth under the trowel—that will not pop and that will make a hard wall.

Lime Alone Does Not Fill the Bill

These results cannot be attained if the mortar is made at the building, either by hand or machine mixed, and using either lump, ground or hydrated lime with Keene's or any other form of cement. In almost every case such mortars will cost more than gypsum mortars—will not be as convenient to prepare, or will work short or stiff under the trowel, and when lump or ground lime has been used there can be no positive assurance that the finished plaster will not blister. While many manufacturers sell a plastering lime which they guarantee against popping, such a guarantee does not and cannot prevent blisters, for as long as lime rock contains impurities and workmen are employed to fire the stone, slake the lime and prepare the mortar in the usual way, pops or blisters cannot be entirely prevented. Some of the finest buildings on the Pacific Coast that have come under my personal inspection have walls and ceilings that are defaced with blisters, and yet in almost every case guaranteed lime was used and the work was done by a recognized plastering firm of standing.

Since all forms of lime mortar made at the building present some or all of the above objections, it would seem that the only solution of our problem would lie in preparing the mortar at a central mixing station and delivering it to the builder as needed. Already this has been tried, and broadly speaking, it has been carried out in two ways. One by mixing the ingredients dry, the builder adding the water, and in some cases, also the sand,

at the building as the mortar was needed; the other, by mixing the ingredients wet and delivering the mortar to the building, as needed, ready for use. As heretofore carried out, both methods have failed to demonstrate that they are soundly practical and worthy of universal adoption, owing particularly to the high cost of the finished mortars.

Some cherish the belief that the dry mixtures offer the only possible solution to re-establish lime. Since gypsum mortars and plasters have been handled only in this way, there are those who infer that all plasters can be successfully marketed only in the dry form. Bear in mind that the gypsum dealer had no alternative—he had to market his gypsum product dry, otherwise it would set up and be ruined. Because the plaster (marketed dry from necessity) won such universal favor, it does not follow that a dry mortar of some kind is the only way in which lime can be successfully marketed. Theoretically, this method presents some attractive features, while in practice it is not inviting, for as energy and money are being spent pushing the single gospel of quality the gypsum salesman continues to walk off with the business.

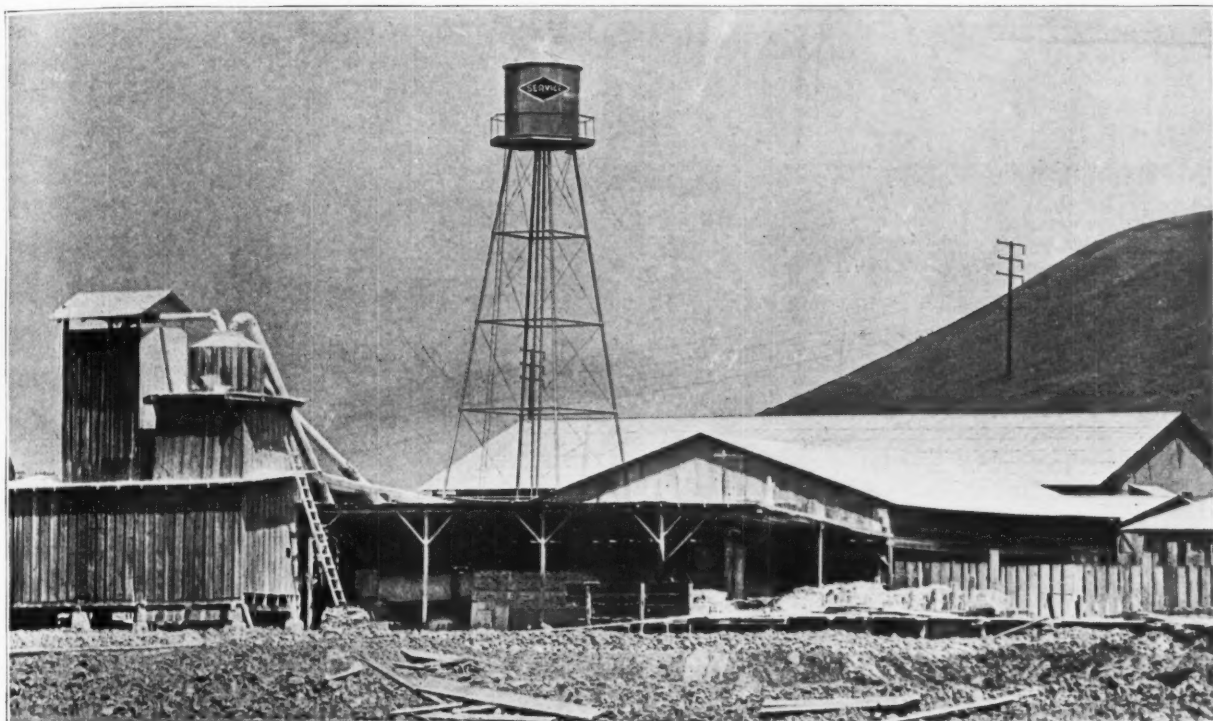
Convenience as Well as Quality Demanded

Quality alone will never butter our parsnips, and until we realize that quality, convenience, etc., should be coupled with a popular price, all of our lime plasters will remain chained down to relative oblivion. Some manufacturers, seeing this and believing that a plaster of hydrated lime and a suitable cement could not be sufficiently reduced in cost to successfully compete with gypsum, have confined their efforts to improving their hydrates and now they are carrying on a vigorous campaign for straight hydrated lime plasters.

Notwithstanding this creditable progress the unbiased and close observer is of the opinion that while the best hydrated lime mortars possess some superior chemical and physical advantages over gypsum mortars—and while certain hydrates, which embody the most desirable plaster characteristics (such as many Ohio limes) will tend to make straight hydrated lime plasters more successful than other former lime mixtures; at the same time the observer fears that these advantages are not considered of sufficient importance to effectively win back to lime the plaster business of this country.

On the other hand, the wet mortar plants have proven disastrous investments in most cities where they were erected, although the lime mortars they turned out were high grade. Despite their recognized quality their cost was too high, and with few exceptions failure of the plants resulted, and in some cases their downfall was only hastened by the introduction of the gypsum plasters. Regardless of these failures we are prepared to say that the wet mortar method can be made the means of re-establishing lime to its former supremacy as a plaster matrix. This wet process is not along the lines followed by those plants above referred to, but along lines followed by plants that are now operating in some Pacific Coast cities.

Because of former disasters there are those who will be inclined to brand any wet mortar process as a Utopian idea, but this attitude only shows a lack of knowledge on the subject. Similarly, many lime authorities, so-called, contended that the hydrating of lime on a large commercial scale could never be successfully ac-



Hydrated lime plant of the Blue Diamond Plaster Co., Los Angeles, Calif.

complished, and yet, through the invention of suitable machinery, the hydrating of lime has become a sound and recognized business and is proving a boon to many lime companies as well as to the concrete builder, the chemical and allied trades and others.

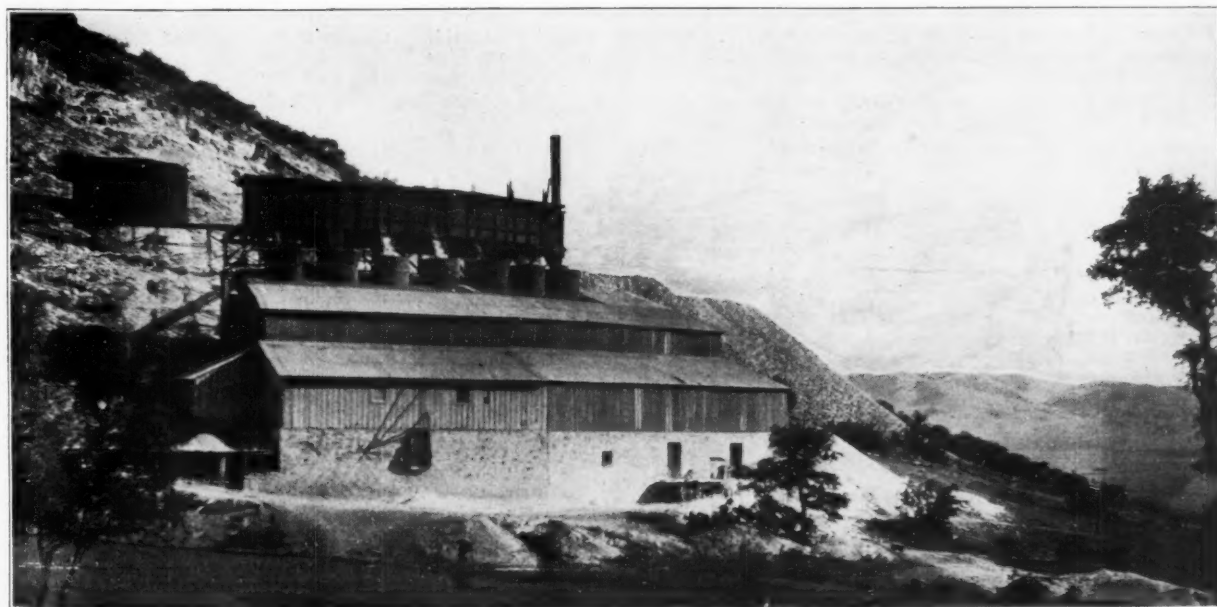
History of the Blue Diamond Plaster Co.

Following is a rather sketchy history

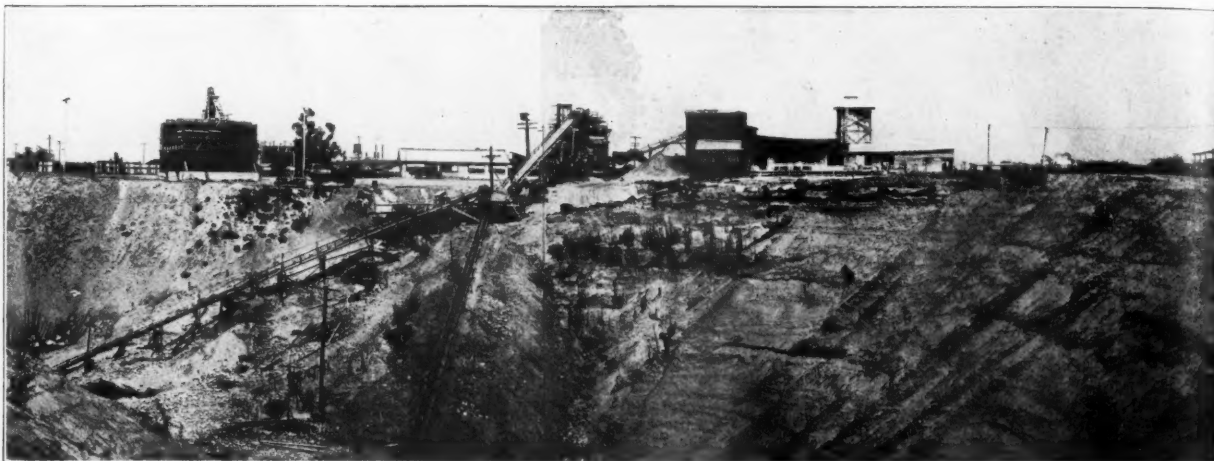
of the Blue Diamond Plaster Co., interesting, though, because probably it is typical of what similar plants will meet in other cities:

"In May of 1916 there appeared a modest trade announcement by a small ready-mixed mortar concern in Los Angeles, operating under the somewhat ambitious title of The Blue Diamond Plaster Co.

"At this time the sole plant consisted of a small pit and outfit in connection with a mortar plant, for which the promoters even had to purchase their lime. Their production output was limited in the extreme and consisted of ready-mixed lime plaster for interior and exterior work, both of the fibered and unfibered varieties; brick and tile mortar; ready-to-use



Lime kilns and plant at Summit, Calif., of the Blue Diamond Plaster Co.

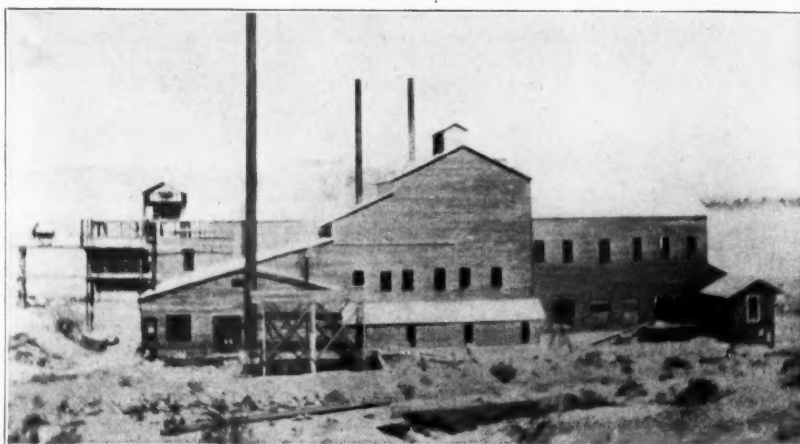


Sand and gravel plant in the city of Los Angeles, Calif.

lime putty, and Keene-cement-gauged mortar.

"Contrary to all precedent and much to the surprise of the trade, the products of this young dreamer became in great demand. Established building material dealers freely and cheerfully predicted a hasty demise for the infant Blue Diamond. The ambitions of this husky young radical would soon be killed, so the critics said, because of the further reason that the great world war was in progress and building activities were at their lowest point in years at prices which barely afforded a living profit. The audacity of any concern to go into a business that had proved a failure wherever it had been attempted in the country, and in a hard-wall plaster town where building was actually nil and prices nil-er—it couldn't be did.

"But what these prophets failed to consider was the business policy of this new concern and the manner in which they



Gypsum mill at Arrowhead, Nev.

had perfected their production plans.

"Quality, convenience and reasonable cost made a hit with the builders and

contractors. Simplified methods and consequent low upkeep and operating costs made the production plant profitable. And



Part of the big fleet of motor trucks for Los Angeles deliveries



The original Blue Diamond Plaster Co. plant at Los Angeles, now many times larger

there you have the secret of the success of this plant.

"Almost from the moment the first batch of plaster was ready to deliver, the Blue Diamond has been in need of elbow room. Its growth has been the natural and logical outcome of a fixed policy to render the greatest service at the lowest possible cost consistent with good business. Today you will find that not only have many of the most notable buildings in Los Angeles been plastered with Blue Diamond lime-gauged plaster, but practically all the bricks of these buildings have been laid in Blue Diamond prepared mortar.

"Mr. Hay attaches much importance to the mortar plant, and explains that the remarkable growth of the company has been made possible because of the perfection of this mixed mortar department, for today it is merely one of the branches of the varied activities of the Blue Dia-

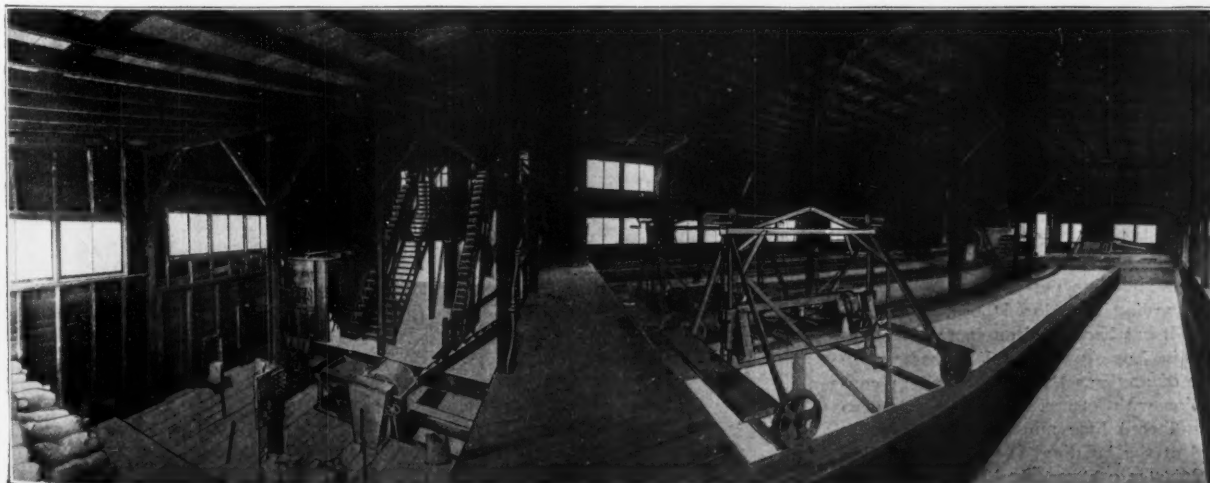
mond company. Though it is looked upon by Mr. Hay as the main trunk of the business, and now the company has sent out other branches, some of them being equally as important as the main branch itself.

"One of the most peculiar features of this business, and one which will strike the reader as perhaps the most remarkable part of this story, is the fact that its development and growth have been accomplished without the aid of a single salesman. The sales promotion is accomplished by the greatest selling force in the world, the word-of-mouth advertising of satisfied customers, plus a well worked out advertising campaign which has been running in the newspapers for several months, though it must in all fairness be said that the advertising was not started until recently, and it is Mr. Hay's proud claim that 'Our customers are our salesmen.'

"And that brings us to the question of how such an unusual business growth can be accomplished without a sales force—usually considered the first adjunct to the plant in its initial years of growth. It will require only one word to answer your query—SERVICE. Not merely service—but real, whole-hearted, active S-E-R-V-I-C-E. A helpful co-operation from the Blue Diamond folks, including all of those little things that go to make for business friendship and permanent, satisfied customers. Such things as good quality properly maintained, reasonable cost, prompt, dependable deliveries have all been thoughtfully incorporated as a part of Blue Diamond Service."

Wet Mortar Plant and Process

The process and machinery for making lime mortar and plaster at the plants of the Atlas Mortar Co., San Francisco and Oakland, and the Blue Diamond Plaster



Interior of wet mortar plant at Los Angeles, showing vats and agitators

Co., Los Angeles, were developed and have been patented by Mr. Hay. The essence of the process is as follows:

The plant uses kiln-run lime in bulk. The process is continuous. The lime is drawn from tight storage bins into slaking tanks, and after the quicklime has been hydrated or slaked to the consistency of thick cream it is strained off into curing vats, the lighter fluid into the "plaster vats" and the remainder into the "masonry vats." After aging, the putty is mechanically aerated by violent agitation, after which it flows through a feed valve to a mixer. Here it comes in contact with sand and Keene's cement, which also feed continuously and uniformly, the cement discharging into the sand feeder before the sand reaches the mixer. As this mass is being churned through the mixer, fiber or hair is fed by a steadily running "draper" to a picking drum, which disintegrates and feeds the fiber in finely separated strands into the cold and continuously mixing mass of mortar. From the end of mixer the mortar is elevated to measured steel loading tanks, from the bottom of which auto trucks of about 4 cu. yd. capacity are loaded by the opening of a gate.

The expense of hauling the extra weight of water in the wet mortar is said to be negligible where auto trucks are employed. Imperfections due to carelessness of laborers mixing the mortar or to incomplete slaking of the lime are eliminated, as the finished mortar is delivered ready for spreading. It may, however, like unmixed hydrated lime, be kept for days without noteworthy deterioration.

The plant is designed in different sizes to suit respective cities or towns, and any one plant is fully operated by one workman up to a daily capacity of approximately 50 tons of finished mortar, two workmen for 100 tons, and so on.

Products Made

The West Coast plants operating under this process manufacture fibered (hemp) lime mortar for both exterior and interior (including colored mortar) use; also fibered lime mortar gauged with Keene's cement in any proportion desired by an architect. It has been found that a mixture of 200 lbs. of Keene's cement to the cubic yard of mixed lime mortar is a most satisfactory material for all purposes, and this is the mixture Mr. Hay recommends. In addition to these mortars the plants also manufacture brick mortar and lime putty.

Regarding exterior stucco, Mr. Hay says, it has been used on scores of buildings in Los Angeles and he has yet to hear of any unsatisfactory result in connection with its use. This outside stucco is a fibered lime mortar which is delivered at the building, and at the building the plaster contractor adds two sacks of portland cement to the cubic yard of lime

mortar. This stucco is used on wood lath, chicken netting, metal lath, and directly on brick, hollow tile or concrete surfaces.

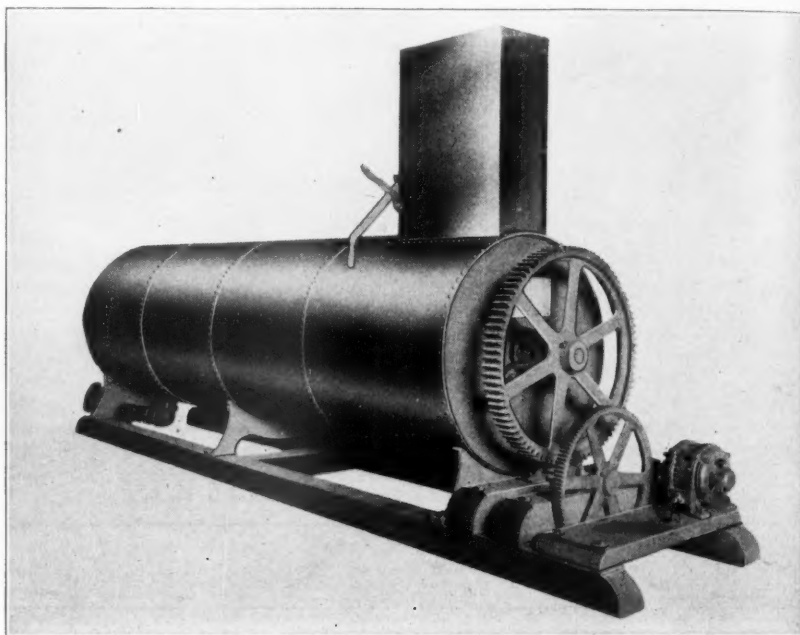
All these mortars are delivered as a wet mixture and are ready for use as delivered to the building without retempering or remixing, except in the case of outside stuccos, where the contractor adds his own cement. Lime putty is delivered in second-hand iron containers, and is sold by the cubic foot. The containers are reused many times. The mortar is delivered in special steel dump-body motor trucks. Hauls of 12 to 15 miles are com-

mon, although 4 or 5 miles is the usual one.

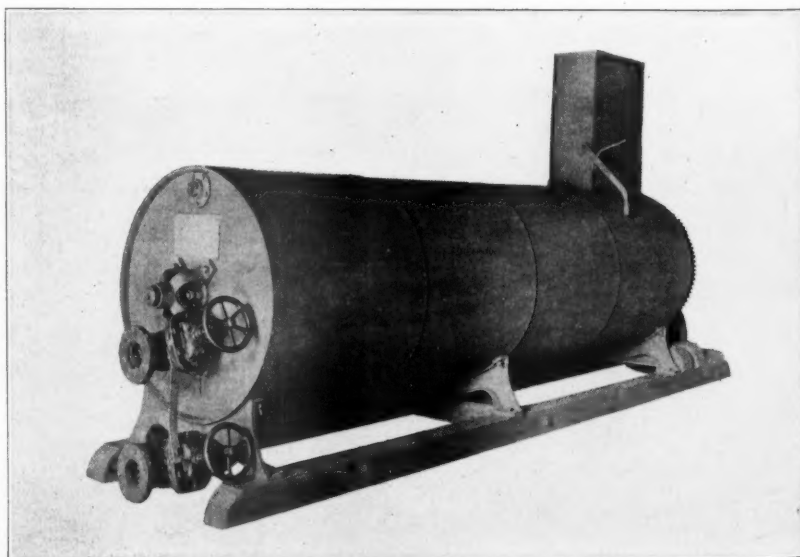
Personnel

The Blue Diamond Plaster Co. is a closed corporation, the stock issue being owned in its entirety by the officers, which include J. W. Jameson, president; W. C. Hay, vice-president and general manager, and A. L. Black, secretary and treasurer.

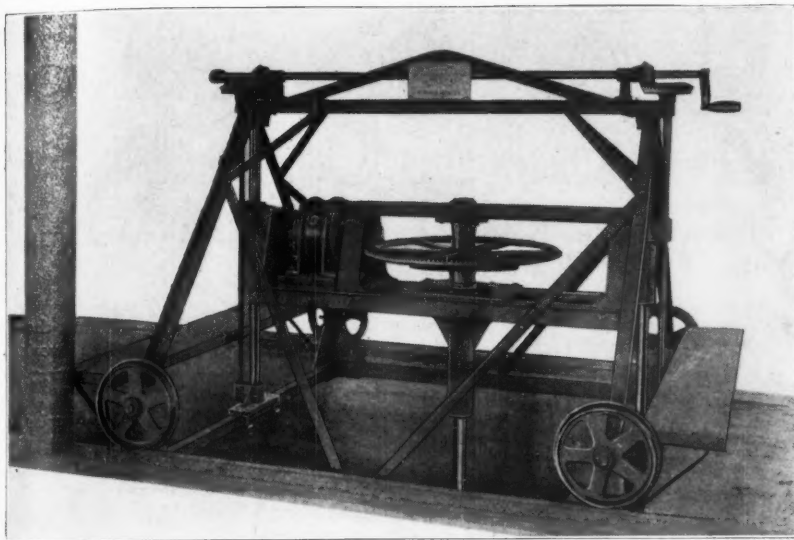
The president of the company is one of the best known oil operators in the West. He is a pioneer of the California oil fields and has extensive holdings over the



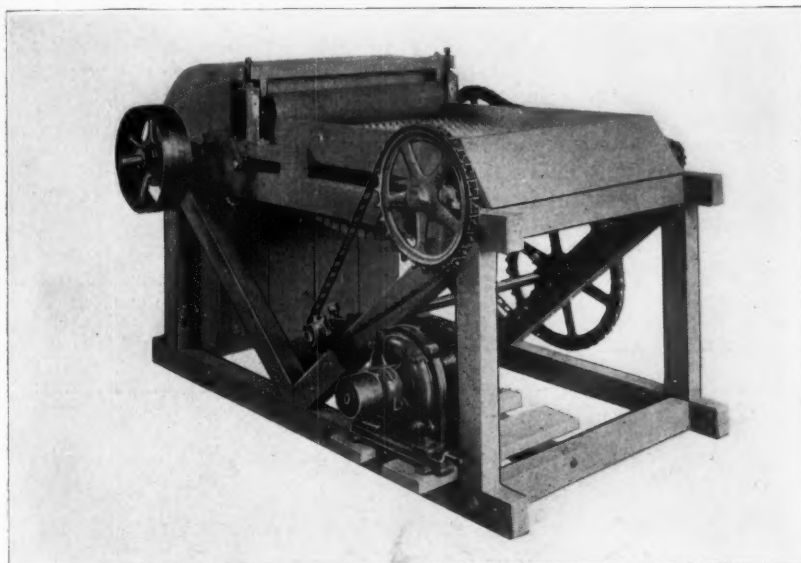
The lime-hydrating machine developed by Mr. Hay



Another view of special lime-hydrating machine



Wet mortar machine-agitator



Fiber picker for mixed plaster



One of the famous "Blue Diamond" trucks

State, but these other holdings and interests have not dimmed his enthusiasm for the Blue Diamond company and he devotes a goodly portion of his time to the supervision of the policies coming under his authority as the chief executive of the company.

W. C. Hay, vice-president and general manager, who developed the process and invented the machinery, was born and reared in Woodstock, N. B., Canada. Leaving there in 1901 he settled in Bellingham, Wash., where he was connected with the First National Bank for several years. In odd times he experimented with mechanics and became interested in mortar-mixing machines. These investigations later led to the erection of experimental plants in Portland and Los Angeles, which were eventually perfected and permanent plants constructed in Oakland and San Francisco in 1913 and 1914, both of which have since been very successful.

Date Fixed for National Lime Convention

NEW YORK CITY, June 15, 16 and 17, is the place and date fixed for the next annual convention of the National Lime Association. Every New York convention of the Association has been better than the previous one, and this year gives every promise of surpassing them all, so every lime man is urged to make reservations early and begin packing his grip.

Operating problems will come in for an unusual amount of attention this year with papers on kiln types and efficiencies, hydration and storage, quarry and laboratory control of the product, etc.

The commercial phases of the lime industry will receive the usual full and adequate consideration.

The new lime plant of the Rockland-Rockport Lime Co., Rockland, Me., will be described by George B. Wood, president of the company.

E. O. Fippin, Mather Bldg., Washington, D. C., is secretary and general manager of the National Lime Association.

New California Lime Plant

THE IMPERIAL VALLEY SAND AND GRAVEL CO., Imperial, Calif., H. W. Dyke, secretary, is stripping a large deposit of crystalline high calcium limestone and marble with a view to determining the extent and value of the property. Mr. Dyke says the company will build, probably this fall, lime kilns and a hydrating plant. This company may also develop the marble deposit for building blocks.

This company has leased its sand and gravel deposit to the county, which has erected a large plant for highway work.

Winter Quarry Operation Proved Successful--And in Canada

Enterprising Department of Highways Ready to Take the Material Finds Equally Enterprising Quarry Operator to Produce

SPRING IS HERE, and from the point of view of timeliness maybe we should have saved this story until next December. But in view of the fact that several state highway departments have not even yet (April 9) got into their working clothes, it may do some good to remind them, and producers as well, that our Canadian cousins in the "frozen north" know how to seize time by the forelock and accomplish something, while on this side of the line highway builders and material producers alike were taking their winter hibernation.

The experience of the Canada Crushed Stone Corp., Ltd., of Dundas, Ont., has proved that quarries can be stripped, stone quarried, crushed, shipped and unloaded as readily in winter as in summer, if one has the will to accomplish these things. First, of course, your customer must agree to accept the material in winter, and be equipped to unload and store it, if necessary. Second, you must be prepared to stock your material at the plant if occasion requires. With these

two factors favorable winter operation is no longer out of the question.

Publicity Feature

Our Canadian cousins—road-builders and crushed stone producers alike—also appreciate the value of advertising—of publicity. They worked together, road-builders and material men, to prevent the 40 per cent increase in rates becoming effective up there. They won. The railways are now mighty glad they did. While unused open-top cars have been accumulating down here in the United States at the rate of 35,000 a week, they have kept those in Canada busy earning revenue for the railways, hauling crushed stone. Following is an article carried in some of the principal Toronto newspapers in March:

Winter Road Construction in Ontario

"An open winter, a labor market flooded with unemployed men, an energetic Department of Highways; these

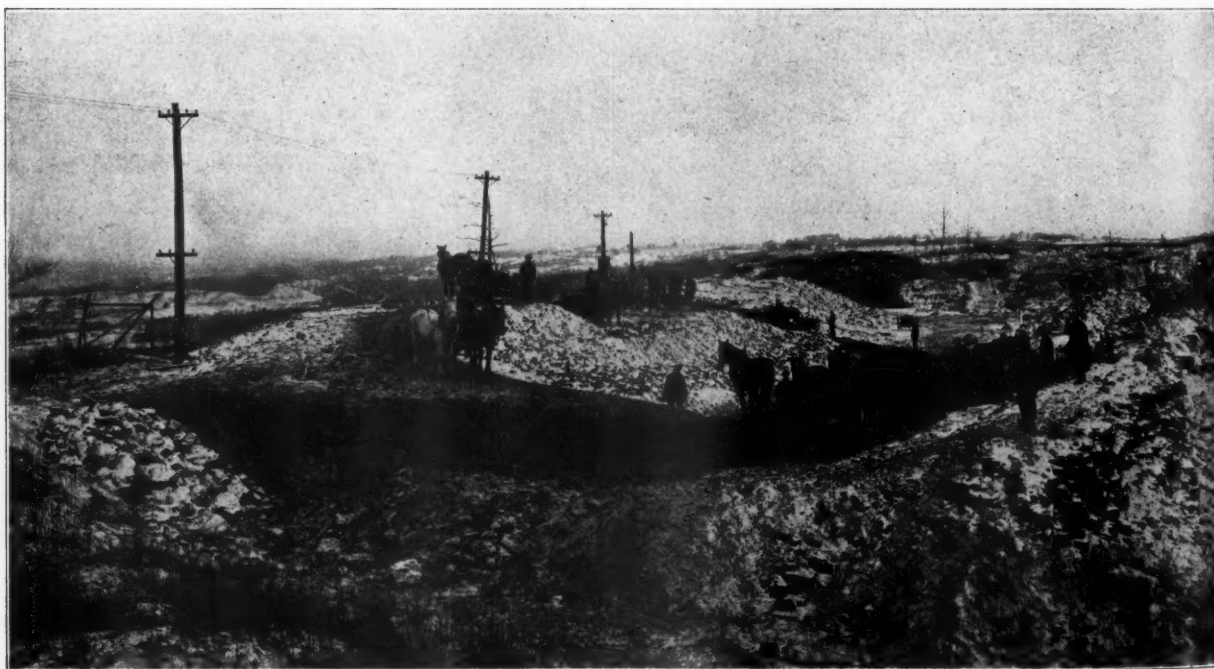
three factors have brought about the unprecedented road construction work of the Provincial Government during the past three months.

"The accompanying photographs of road construction near Brantford, Ont., in the month of February might be duplicated at points near Dundas and Cainesville, where similar work is being done.

"This mid-winter activity is unprecedented, and not content with supplying present needs, the department, bearing in mind the car shortage of previous years and consequent transportation difficulties, is establishing stock piles for early spring road construction at the following points: Bradford, Cainesville, Whitby, Sebringville, and Pickering.

"At each of these points the same modern loading devices are employed as are shown in the photograph of the Cainesville plant.

"This extraordinary activity in a business that is usually dormant in the winter months has given remunerative work to many thousands of men who would



Stripping a Canadian quarry in mid-winter, February, 1921

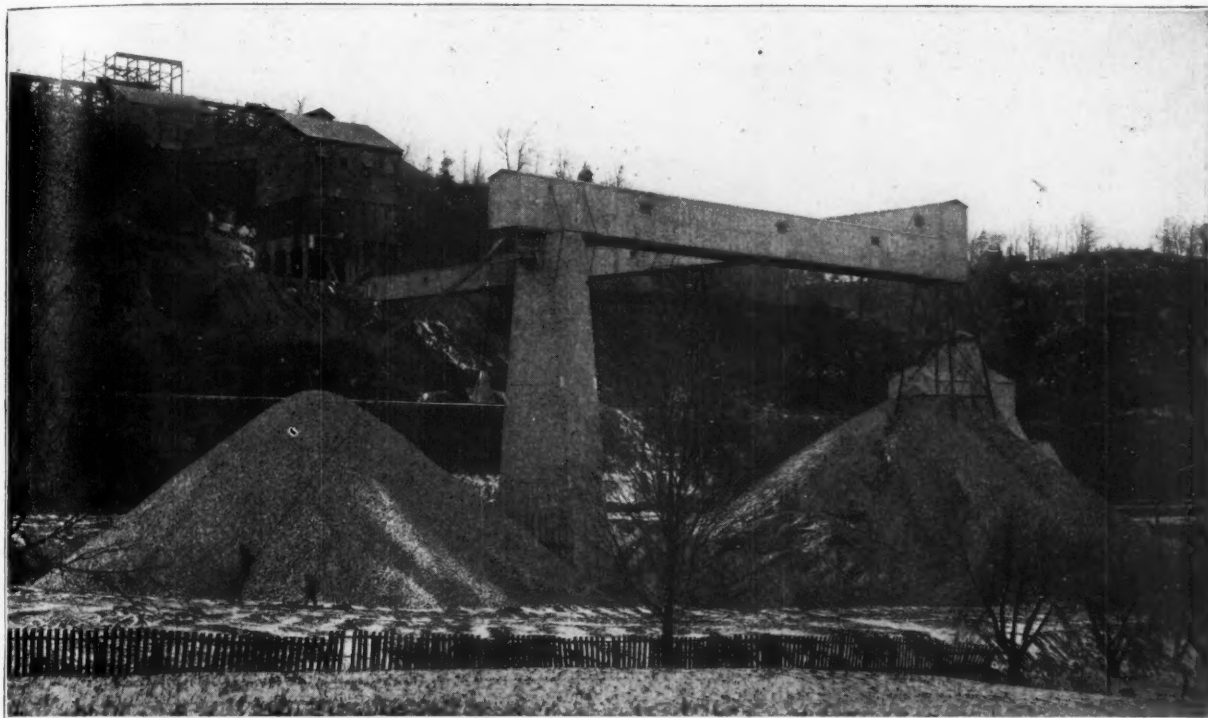
are being kept busy supplying rock for this work; during the winter there has been no let-down on production.

"One of the oldest stone quarries in the

Province, that at Hagersville, is operating to full capacity. Not even the oldest inhabitant can remember of ever before seeing the white steam clouds hovering

over the plant in the dead of winter.

"The quarry at Dundas is also in operation, and here, in addition to daily shipments for provincial and county work



Storage system of the Dundas plant of the Canada Crushed Stone Corp.



Unloading crushed stone for provincial highway work, Ontario

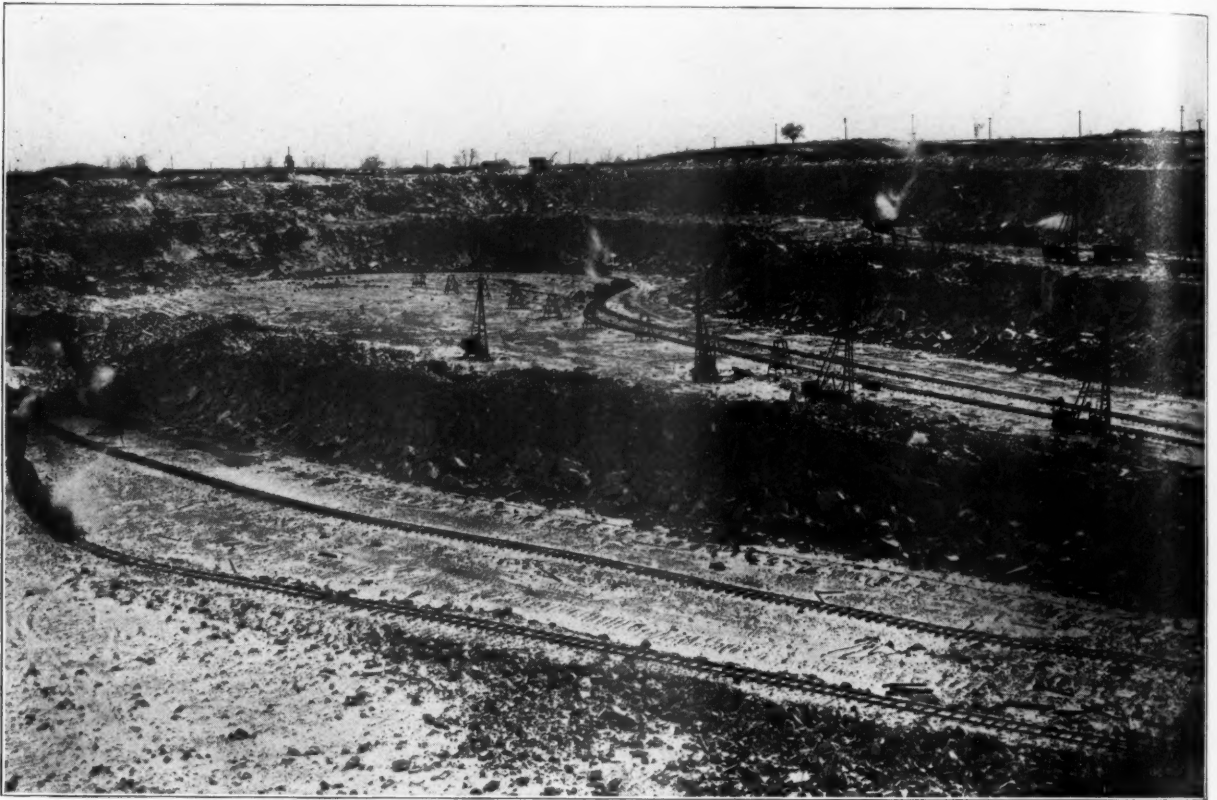
normally be idle, and this year in particular, when the problem of unemployment is such a pressing one, the unexpected demand for thousands of road builders

by the Highway Department has helped materially to alleviate.

"The lead given by the Government has been followed by many Ontario counties,

six of which are now creating stock piles and doing actual construction and repair work on their roads.

"Stone quarries all over the Province



Dundas quarry of the Canada Crushed Stone Corp., operated during winter of 1920-1921



Hagersville quarry and crushing plant of the Canada Crushed Stone Corp.

40,000 tons of crushed stone are awaiting shipment for the government.

"This activity has resulted in a further demand for labor in the crushed-stone industries with its consequent amelioration of the unemployment situation.

"The photographs which accompany this article were shown at the National Crushed Stone Association convention in Toronto to the great surprise of visiting delegates from the United States, who could hardly credit the fact that while most American plants were closed for lack of business, quarries were being operated 12 months of the year and that mid-winter road construction was possible in the land of Our Lady of the Snows.

"Right today Ontario's \$6,000,000 good roads program for 1921 is off to a good start. The coming autumn will show great things accomplished."

The president and general manager of the Canada Crushed Stone Corp., is C. M. Doolittle. J. B. Hart is secretary. Delegates to the National Crushed Stone Association convention at Toronto last February will remember both as genial hosts.

A complete description of the 50,000-ton storage plant of this company will be found in the August 28, 1920, issue of *Rock Products*.

Rate Decision on Sand

IN A TENTATIVE REPORT on No. 11806, United Iron Works, Inc., vs. Missouri Pacific, Director-General et al., Examiner Myron Witters recommended a finding that rates on sand from Fort Gibson, Okla., to Joplin, Webb City and Springfield, Mo., and to Pittsburgh and Iola, Kan., were, are, and for the future

will be unreasonable and unduly prejudicial to the extent that they exceeded, exceed or may exceed six cents to Joplin and Webb City; six cents to Springfield via the Frisco and seven cents via the Missouri Pacific; six cents to Pittsburg via the Frisco and 5.5 cents via the Missouri Pacific and 5.5 cents to Independence and Iola via the Missouri Pacific, plus, in each instance, the increases allowed in Ex Parte No. 74. He also recommended reparation to the basis of the rates recommended.—"Traffic World."

Graphite Industry in 1920

THE QUANTITY of domestic flake and amorphous graphite sold by producers in the United States in 1920 amounted to 9,510 short tons, an increase of 28 per cent over the quantity sold in 1919.

The value of the graphite sold in 1920 was about \$626,201, as compared with \$778,857 in 1919. These figures are based on reports made by producers to the U. S. Geological Survey, Department of the Interior.

Operators in Colorado, Nevada and Rhode Island reported sales of 4,694 short tons of amorphous graphite in 1920 at an average price of \$10.60 a ton. This was \$3.52 per ton less than the average price in 1919.

The sales of crystalline graphite in 1920 amounted to 9,632,360 pounds, valued at \$576,443, as compared with 8,086,191 pounds, valued at \$731,141 in 1919. The average price per pound in 1920 was 5.9 cents; in 1919 it was nine cents. Alabama led in the production of crystalline graphite, the sales in 1920 amounting to 4,894,648 pounds, or 51 per cent of the total quantity sold in the United States.

The sales reported from New York and

Pennsylvania amounted to 3,552,687 pounds, or 37 per cent of the total in the United States, and the remaining 13 per cent was reported from California, Montana and Texas.

The Acheson Graphite Co. reported the sale of 7,399,749 pounds of artificial graphite, which it manufactured at its plant at Niagara Falls, N. Y.

Colorado Senate Passes Cement Bill

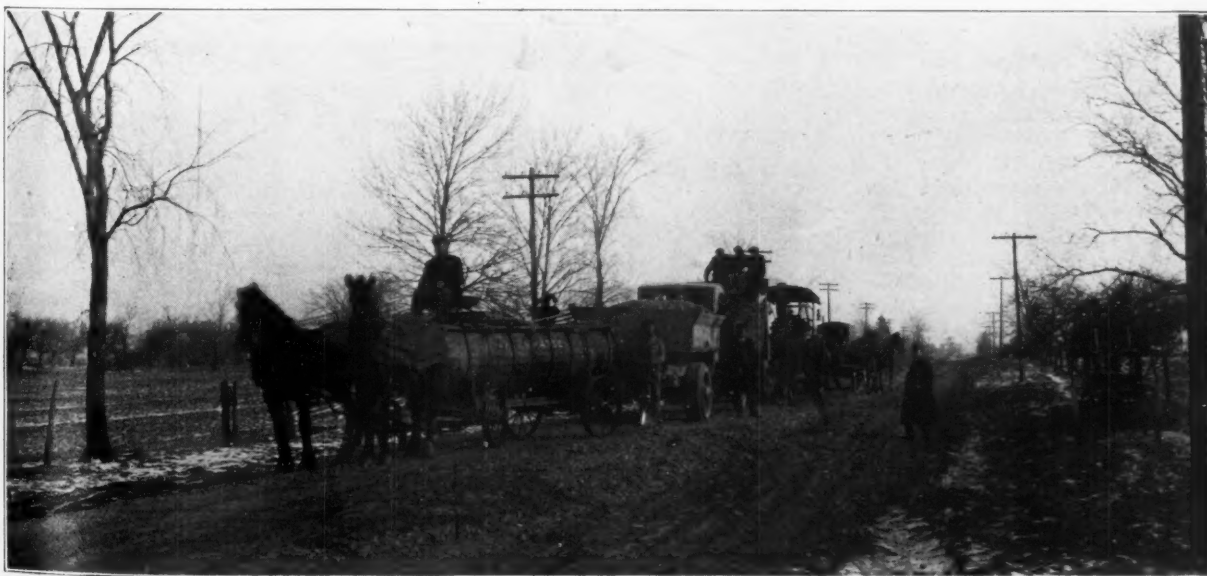
A BILL providing for an appropriation of \$500,000 for the erection of a state cement plant at the state penitentiary was passed recently by the Colorado senate. The bill was bitterly fought and finally passed by a vote of 18 to 17.

The provisions of the bill are to establish and operate an up-to-date cement plant which will supply cement for state and county work.

Low Gravel Bid in Owensboro, Kentucky

THE EVANSVILLE SAND AND GRAVEL CO. has been awarded the contract to furnish 10,000 cu. yds. of gravel for road construction work near Owensboro, Ky., this summer.

At the last meeting of the fiscal court, at which bids for furnishing the gravel were received, the court refused to let the contract on the ground that the bids were too high. The lowest bid was by the Evansville company, which offered to furnish the gravel for \$1.10 a cu. yd. The company cut the price to \$1 and the county officials decided to accept the bid. The county is now paying for its gravel this year 20c per cu. yd. more than last year.



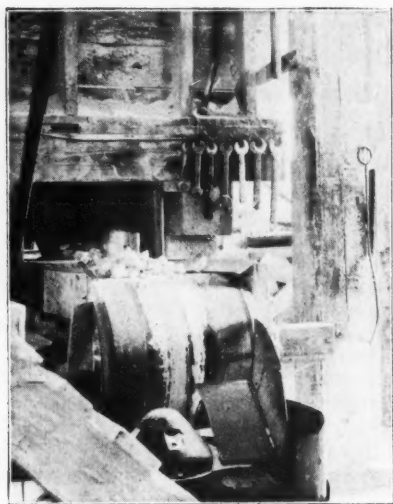
Putting crushed stone on macadam roads in Ontario Province in February



Hints and Helps for Superintendents

Handy Tools

IN A PLANT having a regular repair shop, or machine shop, it is probably best to keep hand tools systematically and issue them to workmen on checks or in any other way so that someone is responsible for their return. But in a small crushing plant, or sand and gravel plant, it is very likely more convenient to have them handy—as the illustration shows. This is certainly a big improvement over leaving them around loose on benches or in corners where a search has to be made every time they are wanted.

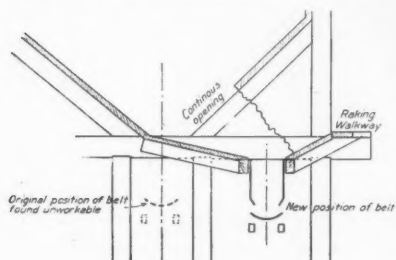


Tools kept handy in crushing plant

A Louvered Bin

A CONSTRUCTION said to facilitate feeding crushed rock from a V-shaped bin to a belt conveyor is shown herewith. It is described by W. M. Hutton in "Mining and Scientific Press," who writes:

"The fundamental idea is to create what in hydraulics is known as a 'break-pressure' station in the stream of material. It is true that a laborer has to keep the



Construction of louvered bin

rock 'moving' above the feed-chute, but with the wide and continuous exit from the main bin this is an easy matter."

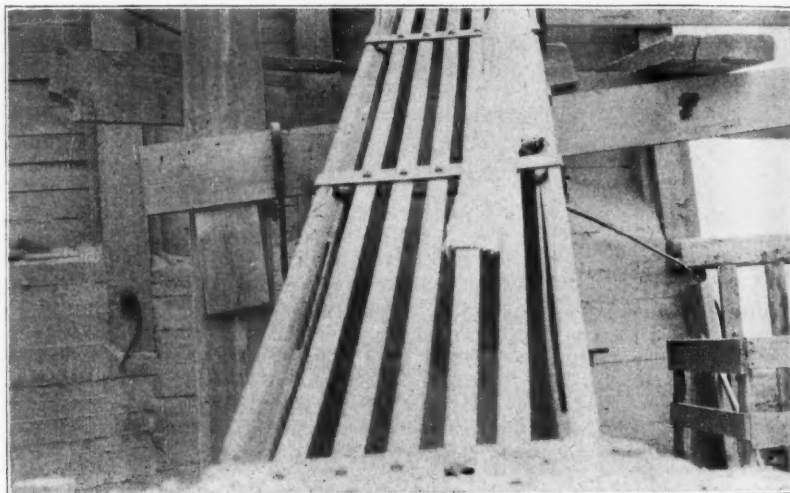
Covered Stone Chutes

ONE NEEDS an A. E. F. "tin hat" around the average stone-crushing plant, unless he doesn't mind bits of stone bouncing off his "bean" now and then. The illustrations below show how the Norton Lime and Stone Co. (F. P. Norton, secretary and superintendent), Cobleskill, N. Y., has found a way to keep crushed stone in the chutes from the screens to the recrusher. These recrusers are on the same working platform with the ini-

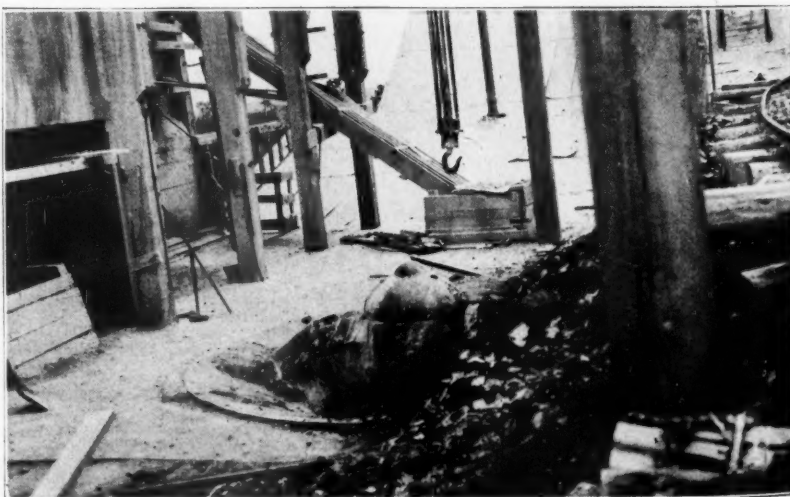
tial crusher, as the lower view shows. There are two chutes and two recrusers, one each side of the primary crusher.

The chutes are lined with corrugated steel plates (ordinary galvanized steel siding, apparently) and over the top are flat steel bars carried on cross straps as shown. The bars are fastened to the under sides of the cross pieces with counter-sunk bolts, so that they have no obstructions on their inside surfaces.

This type of chute covering has several distinct advantages over a screen-covered chute. There is small chance of the pieces of stone becoming wedged in the chute and blocking it. Should the chute



Strap-iron covered stone chute at crushing plant



Initial crusher in foreground, re-crusher and covered chute in background

become clogged it is easy to free it. Any particular bar that wears out or is broken can be easily replaced. The whole cover of the chute is easily removed if the occasion requires.

Producer Gas Experience with Burning Lime in Shaft Kilns

THE TWO ILLUSTRATIONS herewith show a producer-gas installation at an Eastern lime plant that has been abandoned. The kilns are now being fired with coal or with a combination of wood and coal.

This plant was a pioneer in producer-gas lime burning and it probably paid dearly for its experimenting. Undoubtedly this installation was an important factor for many years after in prejudicing lime manufacturers against the use of producer gas for lime kiln installations. Possibly its baleful influence is not yet ended, although a few lime manufacturers in this vicinity have since had very favorable results with producer-gas firing.

The installation is interesting and should be preserved as a historical relic. It is a splendid object lesson in how not to do it.

The gas producer was located at the far end of the plant (see second view). In the first place it looks doubtful if it were of sufficient capacity to serve all the kilns it was connected up with.

In the second place, as is of course well known now, the gas should be led direct to the kiln furnaces by the shortest and most direct route. Producer gas carries certain heavy gases, or smoke, which easily settles out as soot or tar if given the least opportunity. Anything that tends to slow up the velocity of the gas or cool it, which is the same thing, in its course between the producer and furnace, furnishes an opportunity for it to deposit its load of tar and soot. The accumulation of this material not only hinders operation, but it is usable fuel being wasted.

It is doubtful if a gas conduit could have been designed, better calculated to do these things than the one shown, with its square corners, elbows and steps. Evidently ample provision was made for cleaning out the soot and tar (by hand), but such elaborate provision would not have been necessary if more provision had been made to prevent the deposit of soot.

This is not written in any sense of criticism of the people who were responsible for the installation, for remember it was a pioneer one and there was much to learn about producer gas and a great deal about its application to lime burning. As a matter of fact the writer does not know its history other than that the installation is no longer in use. The point of this

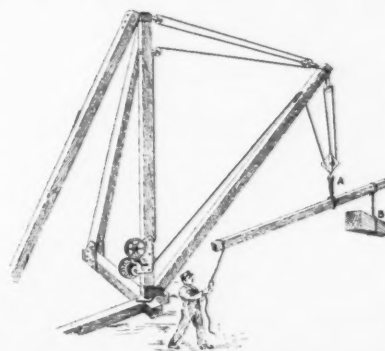
little story merely is, if you hear producer gas condemned as a fuel for lime kilns, bear in mind this installation and find out if the particular case under discussion was not more or less like it.

Extending Reach of a Derrick Boom

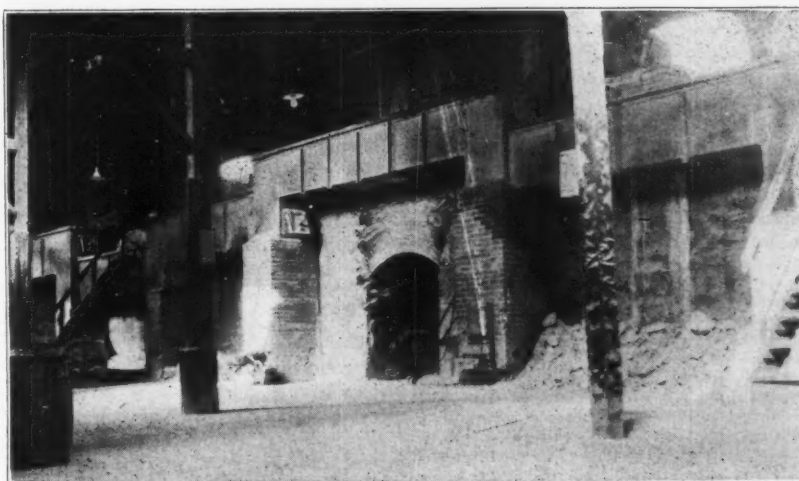
THE REACH of a derrick boom determines its radius of action. This radius can be increased by a simple expedient so that material can be handled in corners that would otherwise be difficult to reach. Steel or other material can also be shifted and put into place more readily by its use than by raising and lowering the main boom.

The device consists of a timber, usually a spare derrick boom, *A*, about which a sling is placed in such position as to almost balance the load, *B*. The overbalance is left on the free end of boom *A*, to which a rope is attached. When the load *B* is approximately in position, it may be easily

maneuvered into place by pulling down on the rope to elevate it and from side to side to shift to position. Too great an overbalance on the free end of boom *A* would make the arrangement awkward to handle. —George J. Young, in "Engineering and Mining Journal."



Simple device for extending the length of a boom derrick's reach



A New England lime plant with an old-time gas installation



Near view of gas conduits showing many angles and turns

Cutting Highway Estimates?*

An Analysis of the Prospects of Reducing Contractors' Bids—Transportation Hazards Threatening Continuous Operation of Plants Is Keeping Up Prices of Cement and Aggregates—Not Estimates but Guess-timates

MANY BIDS for State road work have already been rejected with an accompaniment of most unwarranted mud slinging. Pennsylvania recently threw out 19 proposals and made an unwarranted thrust through the press at her most responsible contractors. Illinois has done likewise, charging her contractors with unscrupulous actions and threatening to build roads by day labor. The Governor's attitude was championed by the press, and in Chicago especially it has shown a disregard of all reason in the matter. Without waiting for an investigation of facts, it speaks of a "profiteering conspiracy" and in careful avoidance of a direct charge refers to "the extortion of the contractors."

Charges of unscrupulous bidding by Illinois officials are a distinct surprise, coming, as they do, so closely upon the following tribute recently paid by the Illinois State Highway Division to its road builders:

The record of the year should not be closed without giving credit to the contractors who fought determinedly to complete their contracts even in the face of this discouraging situation (transportation). The public should know that the increased cost of labor and materials as well as the intermittent supply of materials, causing the contractors to close down work for a day or a week at a time, while being obliged to keep their men on the pay roll in order that their organizations should not be dissipated, has in many cases meant the absorption of their profits and, in some instances, even a direct loss. The contractors should also be commended for their effort to conform strictly to the specifications of the Department in producing a road of good quality despite the unfavorable conditions with which they had to contend.

In the light of such a record which was made not only in Illinois, but in Pennsylvania and other states, it is difficult to believe that highway contractors have suddenly turned their backs upon integrity and have decided to rob the State.

Contractors as well as prospective owners are eagerly looking toward lower costs. They have expensive organizations to be kept busy, and are keenly alive to the benefits that may be derived by releasing the suspended volume of construction. But they cannot reduce their bids until the cost of labor and material drops.

Highway contractors have no objections if the states wish to hold up awards until prices drop, although they are aware of the inadvisability of such a course. But it certainly is most reprehensible for

*Abstract of article in forthcoming "Bulletin" of the Associated General Contractors.

By Ward P. Christie

Research Engineer, Associated General Contractors, Washington, D. C.

public officials and the press to fling mud at the contractors because they refuse to gamble on very uncertain future reductions of cost, and instead base their bids on the present outlook. What some of the elements presented by this outlook are, the following analysis of highway costs attempts to show:

What Material Prices Show

Prices of road materials have not yet declined to the level upon which 1920 estimates were made, and until they do, nothing even approximating a 20 per cent reduction can be effected in concrete road construction.

A comparison of the price of highway materials with that of other commodities carried by the Department of Labor shows that sand, gravel and cement do not follow the trend of either common commodities or other building materials.

February quotations on gravel from 14 of the largest cities showed an average increase of 16 per cent over February, 1920. Sand had advanced 18 per cent and cement 19 per cent. *Producers are evidently trying to reduce prices, but in view of the vast road programs planned and the uncertain prospects for ample transportation they are making no promises.*

Cement was recently cut from \$4.50 to \$4.10 in New York, and in a few cities slight reductions in sand and gravel are noted; but it should be noted that they are reductions from unduly high levels and not from the prices used by engineers and contractors in their 1920 estimates.

Even if the prices of road materials could be reduced 20 per cent and held level throughout the season, and if road labor, which has never reached the high level of other wages, should also be cut 20 per cent, still no such saving could accrue on a finished road. The reason for this lies in the indirect expense of road work and the transportation charges which pre-existing circumstances have already determined. These expenses, independent of labor and material costs, must stand this year as a fixed charge per mile of road.

High Cost of Freight Rates

In many localities the transportation charges on high type road materials has more than doubled since 1917. Order No. 28 of the Railway Administration by placing a flat increase on sand, stone and gravel increased the average rates in 16 states by 50 per cent according to the National Association of Sand and Gravel Producers, which compiled the actual rates. The last increase of 40 per cent in Eastern territory boosted the average to about 110 per cent. These increases have in some cases made the cost of shipping actually exceed the cost of the material itself.

For a mile of 18-foot road the total freight charges assume surprising proportions. At Denver, Colo., the charges are especially high. The cost of shipping cement from Portland, Colo., and aggregates from Pueblo, two usual points of shipment, now exceeds \$11,000 per mile of road built. In Helena, Mont., the cost per mile is \$7,987; in Boston, \$7,750; in Omaha, \$7,725; in Cleveland, \$7,727; in Toledo, Ohio, \$5,857; in New Orleans, \$5,384; in San Francisco, \$3,026. In Seattle the transportation cost per mile for cement alone is \$1,310; in Boise, Idaho, \$7,644. (See accompanying table.) Many other districts are also handicapped by burdensome transportation charges since the rates have been revised.

To show the transportation charges per mile of road in various centers, the accompanying table has been prepared. Tabular values were computed by applying the actual rates between certain cities and their usual sources of supplies, to the quantities required for an 18-foot road slab. Incidentally, the table gives an idea of the losses sustained by contractors where State governments declined to protect them against the last increase.

Freight charges, as shown by the table, are a burdensome fixed expense this year, but they are by no means the only one. As mentioned above, the indirect or overhead expense is also practically fixed and cannot profit much by market conditions. One of its largest components is the expense of equipment which has greatly increased with the adoption of improved methods.

Some 30 Per Cent of Costs Are Fixed

A road-building plant capable of laying 16 or 18 miles during a central State season can hardly cost less than \$60,000.

It may run to \$100,000. The annual expense of such an outfit, excluding operating costs, including depreciation, repairs, interest, taxes and storage, has been found to approximate something over 30 per cent of the initial cost, and to omit this item from an estimate may justly place upon an estimator a charge of ignorant or wilful under-estimating.

Very few of the other indirect expenses show any possibility of reduction. Bond premiums have not decreased, certain liability insurance rates are higher and no one has announced a sudden drop in interest, taxes, or permits. And it is safe to say that in view of the coming demand for competent road men, contractors will not find it advisable to cut salaries in their permanent organizations. In fact, an analysis of the items which constitute the cost of a high-type road this year, shows that over 30 per cent of the cost is already fixed.

When the fixed charges of any project amount to 30 per cent of the total, a reduction of 30 per cent in the variable costs reduces the total only 20 per cent. Thus to secure a 20 per cent reduction in road costs, the aggregate of labor and material will have to decrease 30 per cent.

The High Cost of Poor Transportation

Whether road projects can even then be constructed within the estimates is doubtful, unless the transportation service of last year is greatly improved. That it cannot possibly stand the strain of a construction program as large as the one begun last year is the accepted verdict in transportation councils. The railroads have not been able to increase their equipment materially and no great increase in open-top car mileage, which has always been high, is expected.

A study of actual car records of the carriers leaves little room for optimism, should general building and construction respond to the constant prodding and stimulation to which it is being subjected. Reports from many cities show a belief that these types of construction will not go forward before late in 1921. But if they should perform like Mr. Fulton's steamboat, the disastrous results of last year are expected.

Herein lies another joker in the talk of reducing road estimates. If a contractor were to include in his estimate an item sufficient to cover the contingency of another transportation breakdown, he could never obtain a contract. If he omits it from his estimate, he faces the possibility of bankruptcy. In other words it appears that a construction company is obliged this season to bet against a boom in building and general construction. It is a precarious situation. If everybody gets a contract, nobody gets adequate transportation. This is the situation indicated by last year's record of car orders and carload shipments.

Estimates or Guess-timates?

In view of existing market prices, the transportation situation, and those construction costs which are already fixed, it is not now possible to find wherein a reduction of estimates is possible. Should State commissions ignore these factors and reduce their future estimates regardless, they will strengthen a long standing suspicion that instead of intelligently estimating construction costs, they merely guess.

Quarrymen Seek Change in Freight Zones

QUARRYMEN around Dallas, Texas, are seeking an adjustment in freight zones which will allow fairer competition.

Quarry owners so located as to be in a position to compete for Dallas County contracts are attempting to change the freight zones so as to place them all in the same zone.

TABLE 1.
Freight Charges for One Mile of Concrete Road

Standard Road-18 Ft. x 7-8 In.; 1:2:4 Mix

Materials (Minimum Waste included)

Cement 3,640 bbl. 728 tons
Sand 1,130 c.y. 1695 tons
Gravel 2,210 c.y. 2763 tons

Material	Average haul miles	A Freight charges per mile Jan. 1, 1917	Increase to end of railway administration	Increase of Aug. 1920	B Total increase since Jan. 1, 1917	A+B Present freight charges per mile of road built	Per cent increase since Jan. 1, 1917
Boston, Mass.							
CEMENT from Northampton, Ormrod, Vulcanite, Copley, Pa.; Alsons, Hudson, N. Y.	302	\$1,354	\$786	\$917	\$1,703	\$3,057	125
GRAVEL from Sharon Heights, East Freetown, Walpole Heights, Medfield Junction and Canton, Mass.	24	994	718	608	1,326	2,320	133
SAND from Sharon Heights, Provincetown, Walpole Heights and Medfield, Mass.	46	1,037	658	678	1,336	2,373	129
Totals		\$3,385	\$2,160	\$2,203	\$4,365	\$7,750	129
Boise, Idaho							
CEMENT from Laramie, Wyo.; Devils Slide, Utah.	440	\$5,824	\$291	\$1,529	\$1,820	\$7,644	31
GRAVEL produced locally							
SAND produced locally							
Cleveland, Ohio							
CEMENT from Bay Bridge, Sandusky, O.; Universal, New Castle, Pa.	112	\$743	\$422	\$495	\$917	\$1,660	123
GRAVEL from Nottingham, O.; North East, Pa.	58	1,382	829	884	1,713	3,095	123
SAND from Sandusky, O.; Muskegon, Mich.; Conneaut, O.	93	1,656	492	824	1,316	2,972	80
Totals		\$3,781	\$1,743	\$2,203	\$3,946	\$7,727	104
Denver, Col.							
CEMENT from Portland, Col.	145	\$728	\$291	\$291	\$582	\$1,310	80
GRAVEL from Pueblo	119	3,868	553	1,658	2,211	6,079	57
SAND from Pueblo	119	2,373	339	1,018	1,357	3,730	57
Totals		\$6,969	\$1,183	\$2,967	\$4,150	\$11,119	60
Helena, Mont.							
CEMENT from Trudent, Mont.	68	\$1,092	\$291	\$364	\$655	\$1,747	60
GRAVEL from Monrele and Logan, Mont.	75	1,933	553	1,381	1,934	3,867	100
SAND from Monrele and Logan, Mont.	75	1,186	339	1,187	1,526	2,713	100
Totals		\$4,211	\$1,183	\$2,593	\$3,776	\$7,987	100
New Orleans, La.							
CEMENT from Kasmsdale, Ky.	761	\$1,820	\$291	\$510	\$801	\$2,621	44
GRAVEL from Breckhaven, Miss.	130	2,763	553	553	00	2,763	00
SAND produced locally							
Totals		\$4,583	\$262	\$1,063	\$801	\$5,384	17
Omaha, Nebr.							
CEMENT from Iola, Kans.; Hannibal, Mo.; Independence, Kans.	253	\$1,456	\$437	\$655	\$1,092	\$2,548	74
GRAVEL from Fremont, Valley and Sandel, Nebr.	33	2,763	738	829	1,567	4,310	57
SAND from Fremont and Valley, Nebr.	31	508	339	00	339	847	67
Totals		\$4,727	\$1,514	\$1,484	\$2,998	\$7,725	64
San Francisco, Cal.							
CEMENT from Telamas, Davenport, Bay Point and Napa Junction, Cal.	60	\$546	\$328	\$218	\$546	\$1,092	100
GRAVEL from Niles and Bay Point, Cal.	25	967	553	414	967	1,934	100
SAND produced locally							
Totals		\$1,513	\$881	\$632	\$1,513	\$3,026	100
Seattle, Wash.							
CEMENT from Bellingham, Wash.	119	\$728	\$291	\$291	\$582	\$1,310	80
GRAVEL produced locally							
SAND produced locally							
Toledo, Ohio							
CEMENT from Newcastle, Pa., and Bay Bridge, O.	61	\$699	\$437	\$466	\$903	1,602	129
GRAVEL from Tecumseh, Mich., and Pleasant Lake, Ind.	63	1,091	705	718	1,423	2,514	130
SAND from Tecumseh, Mich.; Sandusky, O.; Pleasant Lake, Ind.	59	797	446	498	944	1,741	118
Totals		\$2,587	\$1,588	\$1,682	\$3,270	\$5,857	126

¹ Average

² Reduced.

All Together Now for Freight Rate Reduction!

Must Either Get an Immediate Reduction on Sand, Gravel, Crushed Stone and Slag or Let the Matter Drop for This Construction Season

GET THE RUST OFF YOUR PEN;

brush up your memory of influential friends, relatives, and either write, wire or see them within the next week. The new congress will soon meet. If you know any congressmen, appeal to them both as friends in distress and in the name of the public welfare. The thing at stake is the life of your industry and the whole construction program of 1921.

No single factor in the present situation is doing more to deter necessary construction work than the hope or expectation of lower freight rates on construction materials, particularly crushed stone, slag, sand and gravel. If we are going to get a reduction, let's get it now, while there is still some chance to move the materials. If we are not going to get it until *all* rates are reduced, railway wages reduced, railway operating expenses reduced, etc., etc., let's have an authoritative announcement to that effect, and let things take their natural course.

One of Country's Largest Producers of Sand and Gravel Says:

A man with large investments in the industry in the Middle West writes:

"Our industry is largely depended upon to furnish the basic mineral aggregate in all construction work and road-building. Notwithstanding this fact, however, the future of our industry is confronted by an extremely serious condition, which, if not quickly remedied, means unquestioned ruin. I am convinced that unless government agencies take steps quickly to bring about an imperative change that we of the sand and gravel industry are riding for a fall and that many associate industries are doomed to fall with us.

"The condition of which I speak is the present high freight rate on sand and gravel shipments, a rate that has been increased 180 per cent during the past two years, increased to such an extent that the increases alone are greater than the aggregate value of the commodity itself plus the freight rate that was in effect prior to the increases. The present high freight rates are not only paralyzing and drying up our sand and gravel industry and depriving the railroads of a profitable revenue they enjoyed prior to the increases, but they are holding up road-building and construction work of all kinds throughout the Middle West.

"There has been appropriated by the federal government and the different states for road-building over \$500,000,000. This is only a small measure of the funds made available by counties, townships and municipalities for roads and streets. The expenditure of practically all of this vast fund, however, has been deferred on account of the present high costs. If this vast fund were to be released it would not only give immediate employment to hundreds of thousands of idle men throughout the country but would put in circulation money which would be immediately reflected in all branches of business.

"The cost of practically all items entering into construction work has been decreased. Labor and material of all kinds have taken a reduction. However, the item that has been increased most exorbitantly, namely freight rates, instead of being decreased have been increased. The present excessive freight rate on building materials, and especially sand and gravel, is merely a tax against the public, and the public has decided not to pay it.

"Leon C. Herrick, state highway commissioner of Ohio; Frank R. Rodgers, state highway commissioner of Michigan, and A. H. Hinkle, assistant state highway commissioner of Indiana, have all come out in public statements stating that all road-building will be discontinued wherever material depending on rail shipments is required. We can produce if necessary letters substantiating the above facts over the signatures of the above officers.

Summary of Freight-Rate Situation

"Pre-war rates on sand and gravel shipments were the result of careful study on the part of the shippers of these commodities, together with the traffic committees and freight soliciting agents of railway companies, and were made based largely on local competitive conditions, local gravel pit competition, quarries, or the possibility of local production of materials, and the knowledge of what the commodity could actually stand. These rates also had their basis in the knowl-

edge that it was a low-grade commodity, that shipments were short hauls, that there was practically no risk in transportation and that it was handled in lots of several cars, and often in trainloads always loaded to full capacity of the cars. That it made use of the open-top cars at a season of year when there was little or no other demand for them. We wish to emphasize the fact, that this point, that the conditions that existed at the time our industry was established, and then these pre-war rates were put into effect, exist today, and if the railroad and producers are to retain this business, it is necessary at this time that consideration be given these same competitive conditions. Surely if we are to maintain this business, we cannot establish rates regardless of these conditions.

"It is clear to us that if the railway companies want to retain this business they will have to give consideration immediately to such reductions as are necessary to retain it, and in such considerations they will have to employ the same plan as was used originally in naming of freight rates or at least take for granted that the original rates were made on a basis fair to both the producer and the railway companies and, taking into consideration all conditions obtaining at this time, make such reductions as will restore parallel conditions.

Present Costs of Producing

"The cost of producing local materials is very much increased and pre-war rates are not necessary in order to compete. As a result of a canvass which we have made to determine the average increased cost of producing local materials, we have found that this cost at this time is about 60 per cent more than during the pre-war period. In some cases where mechanical devices have been used, the increase is less than 60 per cent. During 1920 this local production was increased at least 100 per cent. Costs at this time are considerably less than during last year. For example, we have the comparison of costs, covering local gravel production as shown in the following schedule:

Pre-War	Year 1920	Today
Gravel in deposit		
average cost 10c	20c per	20c per
per cu. yd.	cu. yd.	cu. yd.
Teams per day, \$4.00	Teams per day, \$8.00	Teams per day, \$6.00
Labor per day, \$2.00	Labor per day, \$5.00	Labor per day, \$3.00

"The shipments of sand and gravel have almost always been on short hauls, the reason for this being that local competitive conditions would not permit a high freight rate. There is no other material sold commercially at such a low price per ton and no material delivered by rail that the freight charges represent such a large portion of the delivered price. Increase in freight rates on other commodities did not amount to such a per cent of the value of the product; in fact, the increase in freight alone on sand and gravel today amounts to as much per ton as was the total delivered price of our products prior to the increases.

"When the rates on sand and gravel were made with a minimum of 30 cents per ton and in some instances 25 cents per ton, the average rate of freight paid on the total tonnage shipped from the various plants was about 35 cents per ton. The increases in freight rates since those established on a basis of 30 cents a ton minimum, have resulted in the present line-up with a minimum of 84 cents per ton or a percentage increase of the 30 cent and 35 cent rates of 180 per cent. No other commodities have stood such increases, and every other commodity could have better afforded such increases. The present rates on sand and gravel are unquestionably impossible.

If 40 Per Cent Increase Stands It Will Destroy a Large Part of the Industry

"It is not an exaggeration to state that if the 40 per cent increase or any part of it is let stand it will completely destroy the industry in the rural districts and most of the business which is being had in the cities. If the sand and gravel industry were excepted from the application of the 40 per cent increase, the industry would still be paying more than its share of the necessary rate increases, and we firmly believe that a reduction from the present basis of rates of more than the 40 per cent is necessary, and would prove even more profitable to the railway companies because of the volume of business which could be had.

"During the past two or three years, our objections to freight rate increases have resulted in nothing. Recently we have felt confident that the railway companies would not reduce rates until they needed the business or until they were convinced by the loss of the business, rather than arguments, that lower rates were necessary. We believe now that the railway companies themselves are convinced that lower rates are imperative and will welcome authority from the Interstate Commerce Commission to make these reductions.

"In order that the vast road-building program may go ahead in 1921, these reductions should be made at once. Such action on the part of the Interstate Commerce Commission would not only give

new life to our industry, but to all industry throughout the Middle West, would give employment to hundreds of thousands of idle men, and give to the railroad companies a profitable revenue of which they are so badly in need."

Be Specific

We have knowledge that President Harding, Senator Cummings, and others almost equally prominent in the government know something of the situation and are getting ready to help.

Each and every producer can help them by taking the matter up with congressional friends, or others who are able to reach the ears of those whose help must be had and had immediately. Be specific and ask for the abolition of the recent 40

per cent advance, at least until a study can be made and the rates possibly more equitably adjusted.

This has already been done in Oklahoma, Missouri, New York, Louisiana, Montana, and possibly other states. There is reason to believe there will be no opposition on the part of the railways. They see the need of starting movement of these materials as much as anybody.

Read the article elsewhere in this issue on what was accomplished in Canada last winter, largely because the 40 per cent advance on crushed stone, sand, gravel and slag was *not* put into effect. Are the Canadian railways complaining? They are not. They are damn glad they had the sense not to win their case. Altogether now, with a big push!

Producer Wins Texas Rate Case on Crushed Stone

AFINDING of unreasonableness and award of reparation have been made in No. 11447, J. M. Pearson vs. M. K. & T. of Texas, Director-General et al., opinion No. 6707, 60 I. C. C. 619-20. The Commission condemned the rate on crushed stone from New Braunfels, Tex., to De Ridder, La., because and to the extent that it exceeded the rates prescribed in the Shreveport scale for application between Shreveport and points in Texas. Under the Shreveport scale the rate would have been nine cents. The class D rate of 32.5 cents was collected. Had the rule of a combination of intermediates been observed, the charge would have been 12 cents. Relief for that departure was denied in fourth section order No. 5408, but upon the request of the carriers its effective date was postponed pending a general readjustment of the Louisiana rates. The carriers are required to line up their rates in accordance with the Shreveport scale on or before June 18, and also to make reparation on or before that date.—"Traffic World."

Rate on Silica Sand

AN AWARD of reparation, on account of an unreasonable rate on silica sand, has been made in No. 11518, Century Glass Sand Co. vs. General-Director, as agent, opinion No. 6737, 60 I. C. C. 759-60. From July 25, 1919, to November 10 of that year the Director-General maintained a rate of \$1.80 on silica sand from Imperial, W. Va., to Pennsboro, Pa., a distance, via the short line, of 93 miles and 121 miles via the route of movement, which was used by the Baltimore & Ohio.

Contemporaneously the Director-General maintained rates from more distant points in Pennsylvania and Virginia to Pennsboro actually and relatively lower, a rate of \$1.40 per ton being operative from Dunbar to Pennsboro, a distance of 138 miles.

No reasons were given in the report as to why the higher rates were left in or why the Railroad Administration had declined, without a formal hearing, to make reparation to the basis of the \$1.40 rate established by it on November 10, 1919.—"Traffic World."

One New York Sand Rate Declared Unreasonable

AFINDING of unreasonableness and an order of reparation have been made in No. 11904, L. A. Meron vs. Director-General, as agent, opinion No. 6728, 60 I. C. C. 725, on account of an unreasonable rate on sand from Boonville, N. Y., to McKeever, N. Y., shipped in July, 1918, on a rate of \$2.80 a ton. Contemporaneously the aggregate of intermediates was \$1.30. The Director-General confessed judgment and reparation is to be made on the basis of the combination rate. No kind of complication appears to have been under consideration at the hearing or argument, so that, as the report makes the case appear, there was no reason why it should not have been settled informally without hearing or argument.—"Traffic World."

Ship Cement by Water

RIVER SHIPMENT of cement from Hannibal, Mo., is expected to begin about April 15th this year. Last year, when the railroad car shortage threatened to hold up shipments the barges of the Aluminum Ore Co., of East St. Louis, were utilized to carry cement to southern cities on the Mississippi River. These barges brought ore from the South to St. Louis and went back empty, so that using them as cement carriers on the southern trip was profitable to both the cement manufacturer and the Aluminum Ore Co. About 267,000 barrels of cement were shipped from Hannibal last year, by river and on account of high railway freight rates this figure will probably be surpassed in 1921.

Use of Silica and Other Mineral Fillers in Paints

IV—The White Pigments and Why Inerts Can Not Be Used With Some of Them

THERE ARE NO COMPLETE STATISTICS on the millions of gallons of ready-mixed paints used annually in this country, but judging from the classified sales of some of the larger houses, about 37 per cent are white, 39 per cent tints, and the remainder are "strong" or "heavy" colors such as the dark browns, reds, greens, and blacks (most of the latter however being enamels, ship paints, or other special forms).

The opaque white pigments are therefore important and they differ from the inerts in being more expensive, and in having a much higher refractive index, to which they owe their opacity in paint vehicles. From very early times down to the middle of the nineteenth century Basic Carbonate White Lead was practically the only white pigment sufficiently opaque to make good white paint. In comparatively recent times there have been added, Zinc Oxide, Basic Sulphate White Lead, Lithopone, and within the last year or two Titanox (a combination of Titanium Oxide with Blanc Fixe).

There are three or four white leads, namely Dutch Process, Quick Process, Electrolytic Process, etc., and several Zincs such as French Process, American Process, and Leaded Zincs, the last in several grades according to the amount of lead contained. The Basic Sulphate White Lead is also widely known as Sublimed White Lead, which is a copyrighted trade-name.

However interesting it might be to discuss the merits and demerits of paints made from these pigments, and mixtures of them, we must here confine ourselves to the discussion of how far the cost of such paints may be lowered economically by the addition of silica or other inerts. We may say in passing, however, that the use of lithopone is practically confined to interior paints and undercoatings, and that titanox is too recent a product for anybody to know just what it will do in actual service although it promises to be a most important addition to the family of whites.

None of these whites is ideal. Each has both merits and defects not possessed by the others. They are more or less reactive with the vehicles used in the different types of paint previously mentioned, and a careful selection is necessary in making a white paint in each of these types. Notwithstanding the notable dissimilarity in composition and character there are two outstanding features common to all of them which are of fundamental importance to

By F. P. Ingalls

Chemist, John W. Masury & Son, Manufacturers of Paints and Varnishes, Brooklyn, N. Y.

our present discussion; first, they show no pronounced favorable influence in prolonging the life of the vehicle, and therefore are not greatly superior to the inerts in this respect; and second, their hiding power is weak compared to iron oxide and many of the other strong colors.

Effect of Silica Inerts

The bearing of the first feature is that it makes comparatively little difference in durability whether inerts are present or not. It has been a common observation for many years that tinted whites, upon exterior exposure, are more durable than the same whites not tinted, and since ochre and other siliceous colors have been most frequently used (because of their perfect permanency) in making these tints, it has seemed reasonable to many that silica might be the causative agent. This hypothesis is contradicted by the fact that lampblack, chrome yellow, chrome green, iron oxide, and even some of the less stable colors, show the same general effect.

At present the most tenable theory is that the presence of any pigment which obstructs the passage of actinic light defers the decay of the vehicle, and of course all the colored pigments do this, especially the reds and blacks. It is really quite remarkable how much a very small proportion of tinting color increases the hiding power of such paints, and, knowing this, it is not unreasonable to attribute the increased durability to this fact.

Rain and sunlight are well-known destructive agents, and, while the water is undoubtedly potent in hastening decay, there is very little doubt that the actinic rays of sunlight are at least an active auxiliary agent. There is nothing therefore to show that white inerts add to the life of a paint, in any direct sense, provided the opaque pigment itself be reasonably stable; on the contrary, reasoning from what we really know, the influence ought to be in just the opposite direction, because hiding power is decreased, but in practical application this effect is sometimes counteracted and we must now consider how.

Avoiding complex figures as much as possible, let us take a straight lead-zinc-

linseed oil paint containing 60 per cent pigment; to this let us add silica, china clay, or other inert, to the extent of 10 per cent of the pigment. Several consequences ensue, viz.: the volume is slightly increased (about four per cent) and the cost correspondingly reduced; the increase in the volume of pigment causes a marked increase in the consistency or "body" of the paint, and therefore the spreading rate is reduced with the result that a gallon does not go so far. The net result of all this leaves us just about where we started and the inert has done neither much harm nor much good.

If, however, we replace 10 per cent of the opaque pigment with inert we indeed reduce the cost, but against this we reduce the hiding power without a corresponding gain. To carry this matter into detail with the different whites, or mixtures thereof, and the different available inerts is far too complicated for consideration here, but it is a fair general statement to say that Outside Whites in which inert has been substituted for opaque pigment, even though purchased at a somewhat lower price, are no more economical to the consumer than the straight paints.

No Field for Inerts in First-Class Outside Whites

Relatively weak hiding power, the second feature noted, leads to a similar general conclusion, for, as a matter of fact, none of these whites, nor any mixture of them, when made up into exterior paints of average brushing consistency, will show complete hiding power in one coat. Under these circumstances it is evident that in outside whites for first-class painting there is little field for the use of inerts. For rough lumber, for the chicken coop, or for the backyard fence, inerts up to 25 or 30 per cent of the total pigment may be economical, but here as elsewhere failure comes oftenest from unsound vehicle, rarely from the pigment whether much or little inert be present. The hiding power may be shot to pieces with inert, but the durability in white paints is mainly dependent upon the vehicle even though it be admitted that the well-known whites are not all exactly equal in their influence on the life.

Inerts in Oil Colors

Viewing the general subject from still another angle we come to the "Oil Colors" where inerts are for the most part not admissible, but which in former times were

especially subject to gross adulteration, chiefly with barytes, because they are sold by weight and because when used in conjunction with these colors barytes requires little or no additional oil. Oil colors are used almost exclusively for tinting and toning, and after a proper selection of the dry pigment the highest possible concentration is demanded.

It would require a separate essay to describe the properties of the different dry colors, aside from mere tinting strength, which determines their superiority; such information must be sought elsewhere, but for our present purpose the important point is that when once selected the full tinting strength should be retained and never be reduced with inerts of any kind. There are two exceptions to this rule, namely, Venetian Red and Chrome Green.

We have already seen how standard Venetian red is made, containing about 40 per cent oxide, and in this combination the actual oxide is considerably cheaper per unit than the pure oxide made separately; further, when made into oil color this red is frequently thinned straight to be used as a self-color where it would be sheer waste to use pure oxide as we have already seen. The case of chrome green is quite similar; it is also used very frequently as a self-color, perhaps in larger quantity than is used for tinting, and there is no sense in applying such an expensive color in the pure form when a 25 per cent color, reduced with barytes will more than cover solid in one coat at any practical spreading rate. In such cases the presence and proportion of inert should be publicly acknowledged and the market value judged accordingly.

Use of Barytes in Chrome Green

We have here a very neat illustration of how two reductions apparently wide apart may yet be the same. Chrome green (medium shade) happens to have about the same specific gravity as barytes, therefore the same volume per unit weight, and consequently with 25 per cent and 75 per cent barytes we have one volume of color to three volumes of inert. With the Venetian red however the iron oxide has about twice the specific gravity of the burnt calcium sulphate, therefore half the volume per unit weight, and consequently with 40 per cent color and 60 per cent calcium sulphate we have one and one-half times as much inert by weight but three times as much by volume. Hence, the actual reduction is the same in both cases, for, as previously stated, paints are applied by volume and the hiding power depends upon the volume of opaque pigment on unit area.

Highly opaque colors then, here as elsewhere when used for straight painting, may be reduced advantageously with inerts, but to secure equal reduction with different inerts the amount by weight of any given inert should be proportional to its specific gravity; i.e., if we take the specific

gravity of silica as 2.6 and barytes as 4.4, then 2.6 lbs. of silica will reduce hiding power as much as 4.4 lbs. of barytes and yield the same volume of output. Of course, this does not mean that the amount

of vehicle required to carry these mixtures to brushing consistency is the same, but so far as output in gallons is due to the pigment present the statement holds rigidly.

(To be continued)

Foresees Freight Rate Reduction

O. C. Hubbard, Executive Secretary of the Wisconsin Mineral Aggregate Association, Optimistic on Railway Outlook

"FROM EVERY BIT of information obtainable, analyzing articles in trade papers and magazines and fitting them in with conversations with railroad officials, it is my personal and sincere belief that we are without a single element of doubt going to procure a reduction in our freight rates," writes O. C. Hubbard, Executive Secretary of the Wisconsin Mineral Aggregate Association, in his general letter to members, March 23. "Whenever any subject of sufficient importance comes up that nearly everyone in the country is discussing and 95 per cent of them agree upon, it is fairly safe to believe that the results can be foreseen.

"I will give you herewith some interesting data on the freight-rate problem:

"Some of our members may belong to the U. S. Chamber of Commerce, or know of their 'Readjustment Questionnaire,' sent to all their members. The announcement of complete tabulated answers is expected within a week, representing answers of about 5,000 firms.

"In answer to a notice for suggestions as to what measure of relief the Chamber might advocate through publicity, are the following, in the order of the number of votes received:

1. Reduction of Freight rates.
2. Reduction of Wages.
3. Reduction of Taxes.
4. Reduction of Hotel and Traveling expenses.
5. Reduction in the price of money.

"This tabulation shows that of 5,000 firms (members of the U. S. Chamber of Commerce), the majority of them answered that the paramount issue towards readjustment was a reduction of freight rates.

"As advised last week, the Western Traffic Executives Committee met again last Friday in Chicago, to consider this subject. Yesterday, I talked to the vice-president in charge of traffic, of one of the railroads, and he told me that the subject is so interwoven with a large number of others that the matter of reduction is temporarily held in abeyance.

Link Wages with Freight Rates

"Judging from all that I have been able to gather, the following covers the entire situation and this deduction is picked mostly from what I could gather between the lines in my conversation with railroad executives:

"At present they are having wage controversies, with threatened strikes if wages are reduced, on the one hand, and a clamor by everyone for a reduction of freight rates, on the other. With these two issues paramount in the minds of the executives, they naturally have everyone in this country interested in their scale of wage problems, and it is essential and vital to them to maintain this public interest until the wage problems are settled. Were they to reduce freight rates generally at this time or even on some few commodities, everyone affected by such reduction would immediately lose interest in the wage controversy, to the point that the railroads would lose that much public support in this matter.

"I believe not only our own industry but every other one feels that railroad employees generally should stand a reduction, and I feel, further, that everyone would assist the railroads in every way possible to procure this reduction, particularly to gain their own personal desires, namely, a reduction in freight rates. For this reason, in our discussions with any and everyone, we should elaborate on the two points of the transportation problems—the readjustment of wage scales as well as the readjustment of freight rates.

"Bearing on the freight-rate problem, would call to the attention of all members the article by Mr. Brooker, on pages 34, 35 and 36 of the March 12, '21, issue of ROCK PRODUCTS. Mr. Brooker is a rate expert and his article shows that he has given considerable thought to the matter. He brings out some pertinent points. I am attaching one small part of the article, which covers a particular point. That point is this: that in the discussion generally on freight rates, we should consider the PER CAR PER MILE REVENUE instead of the per ton per mile revenue.

"We are still endeavoring in every imaginable way to hasten a reduction in the freight rates, which we feel positive is coming."

Elsewhere in this issue is a late news item from Wisconsin which shows that Mr. Hubbard and his association have good cause for optimism—due largely to their own activities, however.—Editor.

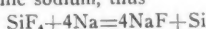
Practical Chemistry for Lime and Cement Manufacturers

Silicon—The Most Common Element in Nature—In All Kinds of Rock—Phosphorus—Arsenic—Antimony—Boron

THE CARBON FAMILY comprises four elements—carbon, which we have already studied; the very important element silicon, the metal tin and an important rare metal, germanium. All of these elements are trivalent and combine with four atoms of hydrogen or two atoms of oxygen.

Silicon, although it never occurs free or uncombined, is one of the most abundant elements found in nature. One quarter of all known matter is composed of silicon and it is the chief ingredient of most important rocks and especially the primary rocks such as granite.

Silicon does not occur free in nature but is obtained by heating silicon fluoride with metallic sodium, thus



Silicon is a light brown powder which burns in air. Ferro-silicon is an alloy of iron and silicon which is used in steel making, otherwise the element silicon itself has no important industrial application.

Silicon forms compounds with hydrogen, chlorine, fluorine and other elements. It also forms with carbon, a carbide ordinarily called "carborundum," SiC. This is made by heating sand and coke to a high temperature in an electric furnace and is used for grinding tools, as it is very hard.

The most important compound of silicon is silicon dioxide, SiO_2 , or silica. This compound is familiar to all of us as it occurs in nature in several forms such as sea-sand, quartz, agate, flint, etc., all of which are nearly pure silica.

Silica is insoluble in water and in all acids except hydrofluoric acid. The silicates are derived from silica just as the carbonates are derived from carbon. Just as $\text{CO}_2 + \text{H}_2\text{O}$ may be considered to form carbonic acid, or H_2CO_3 , from which the carbonates are derived, so $\text{SiO}_2 + \text{H}_2\text{O}$ may be considered to form silicic acid, or H_2SiO_3 , and from this the silicates are derived.

The silicates play an important part in industrial chemistry—clay is a silicate of alumina and glass, cement, brick, china and clay-products all contain silicates in large proportions.

Phosphorus

The nitrogen group contains four elements, nitrogen, phosphorus, arsenic and antimony. Of these nitrogen has been studied, and the others, while important elements, are not directly of especial in-

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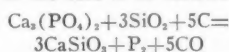
terest to the lime and cement manufacturer. The lime industry touches the fertilizer industry quite closely, however, and hence it may not be out of place to give a little attention to phosphorus.

Phosphorus occurs quite abundantly in nature in the form of calcium phosphate. It is present to a small extent in all rocks and therefore in all soils of which it constitutes one of the principal fertilizing agents. It is of great importance to the life of animals because it is the principal constituent of bones and also an important one of the muscular and brain tissue and the nervous system. The mineral matter of our bones is largely calcium phosphate. Phosphorus is equally important in the vegetable kingdom as it enters into the composition of the seeds of all plants. If soils are deficient in phosphorus, this must be supplied from outside sources. Hence phosphorus compounds are largely used in agriculture.

Phosphorus is prepared by heating calcium meta-phosphate $\text{Ca}(\text{PO}_3)_2$ with charcoal in retorts, when the phosphorus is liberated, distills off and is condensed and collected under water according to the reaction:

$$3\text{Ca}(\text{PO}_3)_2 + 10\text{C} = 10\text{CO} + \text{Ca}_3(\text{PO}_4)_2 + 4\text{P}$$

It is also prepared by the electric furnace in which process sand, mineral phosphate and coke are employed—these being much cheaper materials than those of the older process and the yield is much greater. The reaction in the case is as follows:



The principal sources of phosphorus and its compound are bones and the mineral apatite or calcium phosphate. The latter occurs chiefly in this country in what is known as phosphate rock which is found in large quantity in Florida and Tennessee. Phosphorus also occurs in Thomas slag from the steel mills. Fresh bones contain about 25 per cent calcium phosphate and after burning off the organic matter this is increased in the calcined material (called bone ash) to 50 per cent. Phosphate rock contains from 50 to 70 per cent calcium

phosphate. Phosphorus is used principally in the manufacture of matches and in rat and vermin poisons.

There are three calcium phosphates as follows:

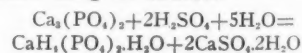
$\text{CaH}_2(\text{PO}_4)_2 + \text{H}_2\text{O}$, mono-calcium phosphate.

$\text{CaHPO}_4 + 2\text{H}_2\text{O}$, dicalcium phosphate.

$\text{Ca}_3(\text{PO}_4)_2$, tricalcium phosphate or bone phosphate.

The first of these is known in the fertilizer trade as "water phosphoric acid," the second as "reverted phosphoric acid" and the third as "insoluble phosphoric acid." The "available phosphoric acid" is the same of the water soluble and reverted phosphoric acid is that portion of the phosphoric acid which is in a condition to be absorbed by plants. The insoluble phosphoric acid, or tricalcium phosphate as it exists in rocks and bone, is not available for plant food and must be converted to one of the other two forms, i.e., mono- or di-calcium phosphate. The expression "total phosphoric acid calculated to bone phosphate" often occurs in fertilizer analysis and simply means the total phosphoric acid calculated to tricalcium phosphate. When fertilizer is bought, what is wanted is a high percentage of available (not total) phosphoric acid.

Practically all the phosphoric acid used in fertilizer comes from Florida or Tennessee phosphate rock. This consists usually of about 70 per cent calcium phosphate. In order to convert this to the mono-calcium phosphate, it is ground and treated with dilute sulphuric acid when mono-calcium phosphate and calcium sulphate result. The reaction being as follows:



In actual practice, a little dicalcium phosphate is always formed due to the fact that if the full amount of sulphuric acid is added the resultant material is damp and sticky.

Arsenic

Arsenic lies on the border line between the metals and the non-metals having some of the properties of each. It is sometimes found native but occurs chiefly in the minerals *realgar* and *orpiment* (which are sulphides of arsenic) and *arsenical pyrite* and *smalt* or *mispickel*. The former is a sulphide of iron and arsenic and the latter of arsenic and cobalt. It is usually ob-

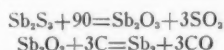
tained as a by-product from the smelting of sulphide ores of copper, lead, etc.

Arsenic appears silver gray, crystalline and slightly metallic. It is prepared by heating the arsenic oxide with carbon $As_2O_3 + 3C = As_2S_3 + 3CO$. Its principal compound is the tri-oxide or arsenious acid which is ordinarily called "arsenic." This latter is an amorphous (not crystalline) white powder without odor or taste. It is a violent poison, as are all arsenic compounds.

Arsenic and its compounds are used chiefly in medicine, in the manufacture of pigments, glass, small shot, insecticides, rat poison, cattle dips, weed killers, hide preservations, certain alloys, etc.

Antimony

Antimony, Sb, also lies on the border line between the metals and non-metals. It resembles arsenic in many of its properties but it comes much nearer to being a true metal. It occurs chiefly in the form of the mineral *stibnite*, Sb_2S_3 , or antimony sulphide. From this it is prepared by first heating the mineral to form the oxide and then smelting the resulting oxide with carbon thus



Antimony has a lustrous silvery metallic appearance and melts at about 284° F. It is largely used in the manufacture of certain alloys notably pewter (80% Sb), type metal (18%), hard lead (5%), Britannia metal (6%), white metal and babbitt metal. Most of the babbitt metals now on the market are alloys of lead, tin and antimony. In such babbitts, the wear increases with the antimony. High antimony alloys are much used with heavy machinery as they are harder, while those low in antimony are used in the more rapid running machinery. The soft babbitts do not usually have enough strength to sustain the weight and shocks of heavy machinery and so are generally used as a liner which is run into a shell of brass, bronze or gun metal. Lead is too soft to be used alone as it will squeeze out of the recesses of the bearing. If antimony is added to the lead, it increases its hardness and brittleness and if tin is added it makes a tougher alloy than lead and antimony alone. Below is the composition of a widely known babbitt.

Lead	80.0%
Tin	5.0
Antimony	15.0

Antimony compounds are used in medicine and in the manufacture of paints and fireworks.

Boron

We have now said something of all the important non-metals except boron. This element really belongs to the aluminum family but it resembles in some respects silicon and in others, members of the nitrogen family. It is a trivalent element like the latter.

Boron does not occur free in nature but like silicon in the form of oxygen compounds, in boric acid and borates. Boric acid occurs in the steam which issues from the ground in certain parts of Tuscany. Borax is found in the Death Valley region of California where calcium borate or the mineral *colemanite* also occurs. Most of the borax sold comes from the latter source.

Boron is a black powder and is most easily prepared by heating boric oxide with

magnesium, aluminum or sodium. For example



The most important compounds of boron are boric acid commonly called "boracic acid," H_3BO_3 , and sodium tetraborate, or "borax," $Na_2B_4O_7$. The chief uses of the acid are as an antiseptic in medicine while borax is a milk alkali and is used to soften water in washing, etc., and as a flux in welding, etc.

Defends Iowa Sand and Gravel Men Against "Gouging" Charge

President R. C. Fletcher, of the Iowa Association, Goes to the Mat With Contractor Representative—Shows Figures Were Not True Statement of Situation

IT IS WITH PLEASURE AND SATISFACTION ROCK PRODUCTS publishes the following letter from R. C. Fletcher, president of the Iowa Sand and Gravel Producers Association. Whenever any responsible party makes charges of "gouging" or other unfair treatment at the hands of the rock products industries, we are going to let our readers know about it, just as we did in the case in point. Our pages are dedicated to the good and progress of the industry. If the charges are true we have absolute faith that the industry as a whole will soon rid itself of any such unfair practices. If the charges are untrue we hope the leaders of the industry will always compel the man who made them to eat his words, which seems to have happened in this case. President Fletcher writes:

"THE EDITOR—In the interest of fair play and for the protection of an infant—but otherwise reputable—industry, permit me to call your attention to an article which appeared in your issue of February 26, 1921, on page 31, where under the heading, 'Highway Contractors Discuss Material Supplies', and the sub-caption, 'The Material Man's Part', it was explicitly charged that 'the material man in Iowa has been gouging the contractors . . .'; also that 'practically every bit of the average price of \$3.99 per yard on 157 miles of hard surface (roads in Iowa) has been caused by the exorbitant price the gravel man has charged for his material. They have advanced the price from \$1.20 to \$1.85 at the pit.' In addition to the gross injustice done to our industry as a whole by such remarks, it is evident that the speaker quoted (L. R. Mackenzie, secretary and manager of the Iowa Street and Highway Service Bureau), if correctly quoted, was either ignorant or very careless in his speech.

"To illustrate: If the average hard road in Iowa were 9 in. thick and the gravel weighed 3000 lbs. per cu. yd. (certainly liberal estimates), such a road at most could contain but about 750 lbs. of gravel (coarse aggregate), and if to the quoted price of gravel at the pit we add \$1 per ton, or considerably more than the average cost of railroad haul in this state would justify, we find that the outside cost of the gravel would be but \$1.07 f.o.b. cars at destination per square yard of pavement, or only 7 cents more than one-fourth (25 per cent) of the figures used by Mr. Mackenzie.

"Whether he was careless or ignorant, the effect is the same; resulting in serious injustice to innocent operators. Speaking for the Iowa Association of Sand and Gravel Producers as a whole, I wish to say the charge as published is untrue. On the contrary, excepting perhaps in isolated cases and localities I believe the situation is quite the reverse; for in spite of the fact that wages were raised twice last year and the cost of repair parts for machinery this winter was much greater than ever before, some of the largest producers have not changed their prices for concrete aggregates since February, 1920, excepting for small winter deliveries from stock piles, to meet the necessary increased cost of storing and rehandling.

"With this explanation, I respectfully ask that this communication be given the same publicity as the article which called it forth; and particularly so because an explanation (by Mr. Mackenzie) which appeared in your issue of March 12 did not explain; in fact, it made a bad matter worse.

"R. C. FLETCHER.

"President, Iowa Sand and Gravel Producers Association.

"Des Moines, Iowa. March 31, 1921."



Aerial view of the sand and gravel plant of the Pittsburgh Land Improvement Co. at Port Washington, Long Island, N. Y. Note belt conveyor from shore to pit. Copyrighted by the Fairchild Aerial Camera



Note belt conveyor from plant to end of wharf, said to be longest in the world. This is the first aerial photograph of a sand and gravel plant ever taken.
Childs Camera Corporation, New York City

A State Commission's Report on Cement Manufacture

South Dakota Ready to Invest \$2,000,000 in Its Own Plant—Excessive Freight Rates One Reason

SOUTH DAKOTA is preparing to spend \$2,000,000 for a state-owned and operated cement plant, as announced in the March 26 issue of *Rock Products*, page 66. The same issue contained a clear and forceful presentation of the cement production problem, by a state highway engineer particularly well qualified to discuss this subject. In order that the other side may have a fair hearing, we reprint below the substance of the recent report of the South Dakota Cement Commission, of which Paul E. Belamy, Pierre, S. D., is the active chairman, the governor being ex-officio chairman:

"The State Cement Commission was organized in August, 1919. Considerable preliminary work had been done by the Governor and State Engineers so that the Commission immediately started consideration of the problems before them.

"The general impression at the time the Commission was organized was:

"That there were a number of places in the state where raw material suitable for manufacturing a good grade of Portland Cement could be obtained.

"That the plant of the Western Portland Cement Co., at Yankton, had been operating successfully for a number of years until it had been bought by the so-called trust and closed down.

"That at Chamberlain, the erection of a plant by the Dakota Portland Cement Co. had been started. Considerable work had been done, some machinery had been bought but activities had been suspended owing to lack of funds.

"It was known that the State School of Mines at Rapid City had investigated the cement possibilities of the Black Hills and found them favorable, in fact had actually made cement experimentally from some of the raw material.

"It was also realized that a shortage of cement was impending.

Section 4, Chapter 324, of the Session Laws of 1919, reads in part, 'Said Commission shall have the authority and it shall be its duty to make a thorough exploration of materials within the state which may be used in the manufacture of cement and cement products.' Acting on this instruction, the Commission began an investigation of the cement resources of the state. This was found to be particularly difficult because there had been no general systematic geological survey of

the resources of the state. While much geological work had been done, it related principally to the water resources of the state and the minerals of the Black Hills. Furthermore, some items of the information published were misleading.

Portland-Cement Material Resources of the State

"We have made a geological survey of the cement resources of the state. In some localities, drilling has been resorted to, to determine the extent of the deposit and to obtain samples for analyses to determine the quality. In other localities where the drilling was not deemed necessary, samples for analysis were taken directly from the exposed faces.

"Some 300 analyses of the cement raw material have been made and compiled together with all previous analysis on record which appear to have any bearing on the investigation.

"Our investigations have also included a survey of the various coal and oil fields available for fuel in South Dakota with their heating value, chemical composition, etc. Due consideration has been given to freight rates on fuel.

"In so far as it is possible through questionnaires to dealers, consumers and others, inquiries have been conducted in regard to the probable future consumption of cement.

"Investigation in regard to the prices for cement charged in the various parts of the state by present manufacturers, have been conducted.

"Our investigation included a census of the cement consumption of the counties and in total for the state for the year 1919. The consumption of cement per capita for the state has been calculated.

"We have investigated the comparative cost of building and operating plants of various capacities from 1,000 to 3,000 barrels per day.

"Preliminary, detailed plans of the estimate of cost of equipment, of cost of buildings and estimate of daily cost of operating a plant of 2,000 barrels per day capacity have been made for the six most promising localities in the state. The totals of these estimates are published herewith for comparison.

Study of Markets

"We have ascertained the cement freight rates from the various prospective

sites in the state and calculated and tabulated the same from each site to each county in the state with totals in proportion to the estimated consumption of cement therein, thus obtaining the average freight rate per barrel to each county in proportion to its anticipated consumption. The same calculations and tabulations have been performed from present factories which are now supplying most of the cement trade in the state. This table is published as part of this report. Rate making bodies and traffic officials of the principal railroads of the state have been consulted with a view of probable reductions and adjustments of the cement rates.

"We have manufactured cement experimentally from various locations in the state to determine the actual relative cost of manufacture and have tested this cement to determine its relative quality.

"We have had the advice and consultation of the best engineers available and have had the information thus obtained checked and confirmed.

"Through consultation and correspondence with the various states in the union we have found that practically all of them have experienced detrimental shortages of cement due to increased consumption.

"Section 5, Chapter 324, of the Session Laws of 1919, says in part:

Whenever the said Commission shall have completed its exploration of the resources of this state—and shall in its wisdom determine that there is great probability that the state can successfully engage in the manufacture of cement and cement products,—it shall then proceed to locate, construct and operate a cement plant.

"Acting on this mandate, we have contracted for the purchase of a cement plant site near Rapid City which contains sufficient raw material of excellent quality.

"This site also includes sufficient land for a future town and has municipal water rights, sewerage disposal facilities and fertile soil for home gardens. It is adjacent to the plant and available for employees' homes.

We Have Summarized the Main Points of Our Findings in the Following Conclusions:

"That we have found the best cement materials in the Black Hills.

"That a first-class grade of cement can be made from the same.

"That we found the chalk rock along the Missouri was of an inferior quality and undoubtedly the Yankton and Cham-

berlain plants were abandoned on that account.

"That in the vicinity of Mitchell we found the chalk rock heavily overburdened and of an inferior quality.

"That owing to cheaper fuel, water power now available, cheap quarry operation and other factors cement can be manufactured at our site near Rapid City and delivered to the consumers in the state much cheaper than from any other point.

"That with the sale of part of the bonds from the one million dollars authorized by the former legislature the Commission will proceed to pay for the site and prepare plans for a new, well-equipped cement plant in which the Commission are convinced they can manufacture a cement which will be equal to the best, at a maximum price of \$1.36 per barrel on the basis of the August, 1920, prices. But that they cannot complete an efficient, economical plant from the proceeds of \$1,000,000 of bonds already authorized. (Another million was subsequently authorized.—Editor.)

"That our estimates show such a plant on the basis of August, 1920, figures will cost in the neighborhood of two million dollars including a reasonable working capital but since that date there has been some decrease in the price of cement machinery and building costs which we hope will further decrease before we are ready to place orders for the same.

"That the Commission is unanimously of the opinion after a thorough investigation of the cement situation in the United States that there are not enough plants now in operation by 50 per cent to furnish the cement that will be needed for building operations, street and road construction to supply the demand for the next five years.

"That there are no cement plants now in operation within 175 miles of the State of South Dakota. There are none in North Dakota, Eastern Montana, Northern Nebraska or Western Minnesota. In fact, there is no good cement material within 500 miles east of the Black Hills.

"That with the prospective demand and use for cement in South Dakota within the next five years, we are of the opinion that a cement plant located at Rapid City would save the people of the state twice the cost of building the plant.

"That out of the appropriation of \$25,000 for this investigation, your Commission have expended to date, the sum of \$12,658.11.

"That the building work of the state has been retarded in brick and concrete and has also been retarded in lumber on account of the inability to get cement for foundation purposes.

"That owing to the large amount of capital required present manufacturers are the only capitalists who would be likely to build a plant in this state. Owing to

the fact that they are now supplying all the cement used in the state, it would not be much to their advantage to build a new plant within the state.

"That the Commission has information which leads it to believe that one of the largest companies which ships cement into the state and from which we bought more than one-half of our cement in the four years from 1916 to 1919, inclusive, has declared 146 per cent dividends on the common stock during that time.

"That the amount of cement shipped into the state in the year 1919 was 741,495 barrels or 1 1/6 barrels per capita.

"That this was an increase in consumption per capita of almost double since 1914.

Look for Big Increase in the Use of Cement

"That in the opinion of the Commission the rate of consumption per capita will continue to increase in the future and particularly so if the cost of the cement to the consumer is lowered to any great extent.

"That cement is a superior building material for South Dakota and that as soon as the available supply and a more reasonable price permit its advantages to be more generally known, its use as a building material will, to a considerable extent, supplant lumber. Up to date five-sixths of the forests of the United States have been used.

"That the present price (December, 1920) to the consumer in this state is from \$3 to \$5 per barrel.

"That there has been some reduction in the price of cement plant construction material and that further reduction can be expected by the time the Commission is ready to purchase the same.

"That there would be a ready market for the entire output of the plant within the state.

"That in case there is a surplus, a ready market will be available in the adjoining states.

"That freight rates on cement are discriminatingly high for this state but the Commission is assured that it will be possible to get a material reduction in the same as soon as they have cement ready to move from a factory within the state.

"That at Rapid City the price of coal and the quality of the same with freight rate considered, are more advantageous than the price of coal at the plants which are now supplying most of the cement consumed in this state.

"That it will take from a year to a year and a half to build a suitable cement plant.

"The State Highway Commission informs us that approximately one-half of the output of a 2,000 barrel per day plant will be used from now on, on the highways of the state for bridges and other structures and that in addition to this, if

paved roads are built they will consume nearly two days' capacity of the plant per mile of road.

"That a 2,000 barrel per day plant would supply about two-thirds of the demands of the state by the time it is completed.

"That a cement plant not less than 2,000 barrels per day capacity would be the most economical size plant to build.

Estimated Price of Cement Under 1920 Conditions

"That a plant of this size could be built and equipped including site and operating capital for about \$2,000,000 under the August, 1920, prices of materials and machinery.

"That from the most reliable information the Commission has been able to obtain the wholesale price of cement to dealers from present manufacturers on November 1, 1919, delivered all over the state in proportion of one barrel per capita of population was \$3.53 per barrel, without sacks.

"That under efficient management a first-class grade of cement could be manufactured in a state plant and delivered all over the state in proportion of one barrel per capita of population at \$2.38 per barrel f. o. b. destination. This estimate is based on figures compiled in August, 1920. Subsequent reductions in material and labor costs would show a substantial reduction from this price.

"That this cost delivered figure of \$2.38 per barrel includes a depreciation charge sufficient to maintain the plant perpetually in operating condition and a sinking fund charge sufficient to wipe out the investment in 20 years and an interest charge on the investment at six per cent until such investment is liquidated.

"That if the prices of material and labor go down to any great extent in the future, the cost of cement manufactured in such state cement plant will go down in proportion.

"That a state cement plant would have a stabilizing effect upon the price of cement to the consumer.

"That with equally efficient management the state would be able to manufacture about 10 per cent cheaper than private companies. The state would have no local or income taxes to pay and the sales expense would be very low because they would sell largely to the State Highway Department and Counties."

Estimated Cost of a Portland Cement Plant at Rapid City

Electric power purchased at 1 1/4 c. kw. hr.	
Stripping shale quarry	Nothing
Shale quarry and equipment	\$ 47,000
Stripping limestone quarry	Nothing
Limestone quarry and equipment	40,000
Buildings and equipment, including engineering	1,570,839
Bags	70,000
Repair parts	50,000
Operating capital for 4 months	222,708
Total estimated investment	\$2,000,547

Iowa Material Men Must Not Discriminate Against State

Law Just Passed by State Legislature Designed to Assure State Same Prices Charged Private Consumers Will Also Help Producer

ON MARCH 17, the Iowa state legislature enacted a bill which is designed to assure state and county highway authorities and contractors on public works the same prices for materials that are charged to private parties. This law is printed below, complete.

It should actually prove a boon to material men for, carried out to the letter, it will have the effect of making all contract prices public. While designed to protect the state and public, it should likewise protect the producers from cut-throat prices made in secret contracts with contractors on private work. It should be a whole lot better than an open-price system of competition, for now a producer knows that if he makes a cut-rate to a private party in order to unload, or to take unfair advantage of a competitor, the state, or county, or contractors on public work can compel that producer to sell to them at the same cut rate.

The law reads as follows:

Section 1. No person, firm or corporation shall use the markets of the state for the sale of rock, gravel, brick, cement, steel or other materials ordinarily used in improving or surfacing any street or highway in this state who shall discriminate as to price, quality or delivery as against the state or any county or municipality thereof, or any public contractor, as in this act defined, as compared with any other person, firm or corporation purchasing such products, either as dealer, agent, middleman or consumer. It shall be unlawful for any such person, firm or corporation to discriminate as to price, quality or delivery as against the state, or any county or municipality of the state, or any public contractor, as in this act defined, as compared with any other person, firm, corporation or organization purchasing their products, either as dealer, agent, middleman or consumer. In actions or prosecutions brought for a violation of any of the provisions of this act the fact that such person, firm or corporation has sold such material at the same time and under the same conditions for a less price to any other person, firm, corporation or organization than to the state, county, municipality or any public contractor, as in this act defined, or a refusal to sell to the state, county, municipality or public contractor, as defined, under the same terms and conditions and upon the same agreement as to delivery, as like material was sold to any other person, firm, corporation or organization shall be presumptive evidence of such discrimination.

Sec. 2. The term "public contractor" as used in this act shall refer to any contractor to whom a contract has been let for the construction or improvement of

a highway or street, the terms of which provide that he shall be paid from any public funds.

Sec. 3. Any person, firm or corporation manufacturing or offering for sale such material in violation of any of the terms or provisions of this act may be enjoined from selling or offering for sale his products in this state, and an action brought by the state or county or a municipality thereof. In case of public contractors such suit may be brought by the contractor with the approval of the state, county or municipality with which he has a contract.

Sec. 4. The Board of Railroad Commissioners is authorized to make full and complete investigations of all persons, firms or corporations engaged in the business of manufacturing and selling rock, gravel, brick, cement, steel and other materials used in improving or in surfacing any street or highway of this state. Such investigation being for the purpose of determining whether or not any of such persons, firms or corporations are violat-

ing any of the provisions of the laws of the state relative to combinations, pools and trusts, and to determine whether or not there is any agreement for fixing prices in violation of such laws, and as to whether or not there is any discrimination as against this state or any municipality or county thereof, or public contractor, as in this act defined.

Sec. 5. In making such investigation the Board of Railroad Commissioners is vested with full and complete authority to subpoena witnesses and to examine them under oath, to order the production of letter, books and documents, and to make records of their proceedings.

Sec. 6. Refusal to obey an order, writ or subpoena of said board shall constitute contempt. Thereupon the board shall certify to the district court of the county in which such disobedience shall occur a record thereof, and thereupon the district court of said county shall proceed at once to hear and determine the matter. In such hearing and determination the laws of the state of Iowa relating to contempt shall govern such proceedings insofar as applicable.

Sec. 7. The Attorney General and Commerce Counsel shall represent the state in all such investigations before the Board of Railroad Commissioners.

Sec. 8. This act being deemed of immediate importance shall be in full force and effect from and after its passage and publication in the Des Moines Register and the Des Moines Capital, newspapers published in Des Moines, Iowa.

W. A. Rogers Against States Furnishing Construction Materials

IN A PAPER presented at the annual meeting of the American Road Builders' Association, Chicago, February 12, W. A. Rogers, president of the Bates & Rogers Construction Co., Chicago, Ill., said:

State Furnishing Materials

"In this connection I have a strong feeling that the furnishing of materials by the State is both wrong in principle and not productive of the best results, either as to harmony between the parties or as to decreased cost. It injects into the work a question of divided responsibility. It makes the State responsible for something which is part of the construction and on which the progress and economical operation of the work is vitally dependent. If the materials are not delivered in the order and at the rate which the work requires it adds to the cost, and the engineer who is not paying the bills can hardly appreciate this as does the contractor who is.

"I know there is a feeling that the State can frequently buy materials more cheaply than the contractor and that it is able to allocate a restricted supply better than the individual contractors buying at random can do. This may be so, but I have a feeling that the competent con-

tractor can ordinarily buy as close or closer and he can surely control the delivery more nearly as the work requires than the State. At least he thinks he can; and, gentlemen, that goes a long way towards making for harmonious relationship.

"If, however, the engineer does specify that the State shall furnish any of the materials, then the State should assume the full responsibility for delivery. If the State fails to deliver its materials as required by the work, thus adding to the cost of the work to the contractor, then in the interest of fairness and satisfactory relationship they should assume the responsibility for such failure. Placing on the contractor a risk over which he has no control is just adding another "gamble" to a game which is hazardous enough without it. Contracts and specifications should be so drawn that they are as free as possible from risks of this kind in the interests of both parties."

Addendum

THE INTERESTING CRUSHING PLANTS of the Natomas Co. of California, described in ROCK PRODUCTS, March 12, pp. 37-43, were originally designed by Earle C. Bacon, Inc., Engineers, 26 Cortlandt Street, New York City. This concern also furnished all the jaw crushers used, which are the well-known "Farrel" type.



Editorial Comment



If every producer will use *all his* influence as a citizen and as a business man in this republic of ours, a condition which is crippling a great industry *can* be rectified. While it may be, and probably is, true that present freight rates on California oranges and Florida grapefruit are too high, neither these nor any other commodity is in the same class with sand, gravel, crushed stone and slag. Reductions in rates of many commodities may well await reduction in operating expenses of the railways. But even the railway men are beginning to realize that it is the height of absurdity to compel an industry—as important from the point of view of tonnage as the bituminous coal industry—to reorganize along lines that will, eventually, practically eliminate the need of railway haulage.

A report issued March 31 stated that on March 23 the largest number of surplus freight cars in the history of American railways was recorded—that number being 459,411, an increase of 35,000 over the previous week. This increase in surplus cars—and a considerable part of the previous total, too—was laid to the falling off in coal shipments. The surplus “coal cars” on March 23 numbered 230,394!

Were mineral aggregate producers inclined to be vindictive they could say to their railway traffic friends: “We told you so, and you deserve it.” For this tremendous surplus of open-top cars is not only the Lord’s retribution for the 1920 sins of the railway managements, but the perfectly logical outcome of their policy of not attempting to move more than one commodity at a time.

However, there is mighty little satisfaction to be gained in damning the railways for their treatment of mineral aggregate producers last year. The thing that should now most vitally interest both producers and the railways is how the same conditions may be avoided this year, because circumstances are rapidly grouping themselves for a repetition of exactly the same thing.

Just as last year the construction season is opening with a strike in the British coal mines, which, if it continues, will mean a big foreign demand for American coal. Domestic consumers are showing a disinclination to buy coal early, doubtless because of an expectation or hope of lower freight rates. Last year almost the entire coal movement was crowded into the months of June, July, August, September and October. It is now the first of April. June is two months off.

Every possible pressure should be brought to bear on highway officials and others contemplating construction to move as much of the bulky materials requiring

open-top cars now, as can possibly be done. The railways would appreciate it. They *need* the business *now*. It would give the railways some appreciation of the need and importance of mineral aggregate traffic.

Once in a while the editor receives some communication, written or oral, which shows there is possibly some doubt in the mind of the questioner as to the editorial policies of ROCK PRODUCTS. We don’t want any misunderstanding on this score. We have only one really fundamental policy—that is: *Honesty is the best policy*. We believe absolutely that any business is best promoted by laying all the cards on the table and making capital out of fair dealing.

For example: A state highway engineer writes an article for consumption by other state highway engineers and by the general public on the cost of building and operating, we’ll say, a sand and gravel plant. We reprint the article for use of our readers in combating a tendency toward state or government ownership, which we sincerely believe, along with other business men, would be a calamity, if generally carried out.

Immediately the question arises in our mind, and very likely in the minds of most of our readers: What qualifications has this engineer to discuss intelligently the subject he has chosen? If we happen to know what his qualifications are, and know that they eminently qualify him to discuss his subject intelligently and thoroughly, should we attempt to hide that fact because if we mention his former connection with the sand and gravel industry there is a possible danger of his article being interpreted as sand and gravel “propaganda”?

Having an abiding faith in the man’s integrity and the honor of his former associates, we think that the best policy is to capitalize this man’s knowledge and intimacy with the industry and acknowledge the former connection at the start, not leave it to be unearthed in a law court or a scandal-loving popular press as something that should be kept hidden, if humanly possible to do so.

Would not a perfectly natural sequel to such a policy of secrecy be to have an opposing lawyer rise in court and with his air of imparting an important piece of information say: “This man *was* a former employee of sand and gravel producers; they haven’t said anything about that, have they?”

Then, would sand and gravel men be in a stronger position if they had to take the attitude, well the cat is out of the bag now, we’ll have to make the best of it; or if they came back: “Yes, this man *is* our former employee; we have made no attempt to hide that fact; it has been published in our trade papers?”

Editorial Policies?

Gypsum Exhibit at Chicago Building Show

WHILE THE GYPSUM INDUSTRIES ASSOCIATION had no exhibit at the Chicago "Own Your Home" show, March 26 to April 2, gypsum wall board was represented by a very attractive feature. The view herewith shows the cross-section of a model house exhibited by the United States Gypsum Co.

As a special attraction on at least one afternoon, two young ladies appeared in overalls and jumpers and nailed up a section of plaster board just to show how easy it is done.

Gypsum was well taken care of on the programs of the various meetings held in connection with the show. Virgil G. Maroni, engineer of the Gypsum Industries Association, read a paper on gypsum plasters and their purpose, which was reprinted in full in the Chicago "Journal of Commerce."

The exhibit was removed complete to the New York show, which opens April 11.

Sand at \$1.38 per Cubic Yard Delivered on the Job in Spokane, Wash.

BIDS ON 5,000 cubic yards of sand for asphalt paving work in Spokane, Wash., ranged from \$1.40 to \$1.75 per cubic yard, delivered on the job. The Palisade Improvement Co. bid 28 cents per cubic yard for sand at the pit and was awarded the contract. The hauling contract was let at \$1.10 per cubic yard. In 1920 the price of sand delivered was \$1.55 per cubic yard.

Fertilizer Business Still Poor

FERTILIZER FACTORIES in the eastern part of the United States report that the advent of spring has brought but little change in the fertilizer market. They are fast becoming resigned to the poor market conditions and are expecting a heavy carry over of materials which were contracted for at prices much higher than those quoted at present, according to the New York "Journal of Commerce."

Lime at the Chicago Building Show

THE NATIONAL LIME ASSOCIATION had one of the most conspicuous exhibits at the Chicago "Own Your Home" Show, March 26 to April 2. Particular interest was shown in lime stucco. The rapidly growing interest in stucco-walled residences made this feature of the exhibit especially valuable.

One of the unlooked for developments of this exhibit was the extraordinary interest shown in agricultural lime which, unfortunately, but quite naturally, had not been considered in getting up the exhibit. This was a most encouraging development.

Mr. Brown, of the Washington staff, was in charge of the exhibit and expressed himself very much pleased with the interest shown, particularly in the case of lime stucco, which seems to offer a great future.

This exhibit moves to the New York show, beginning April 11.

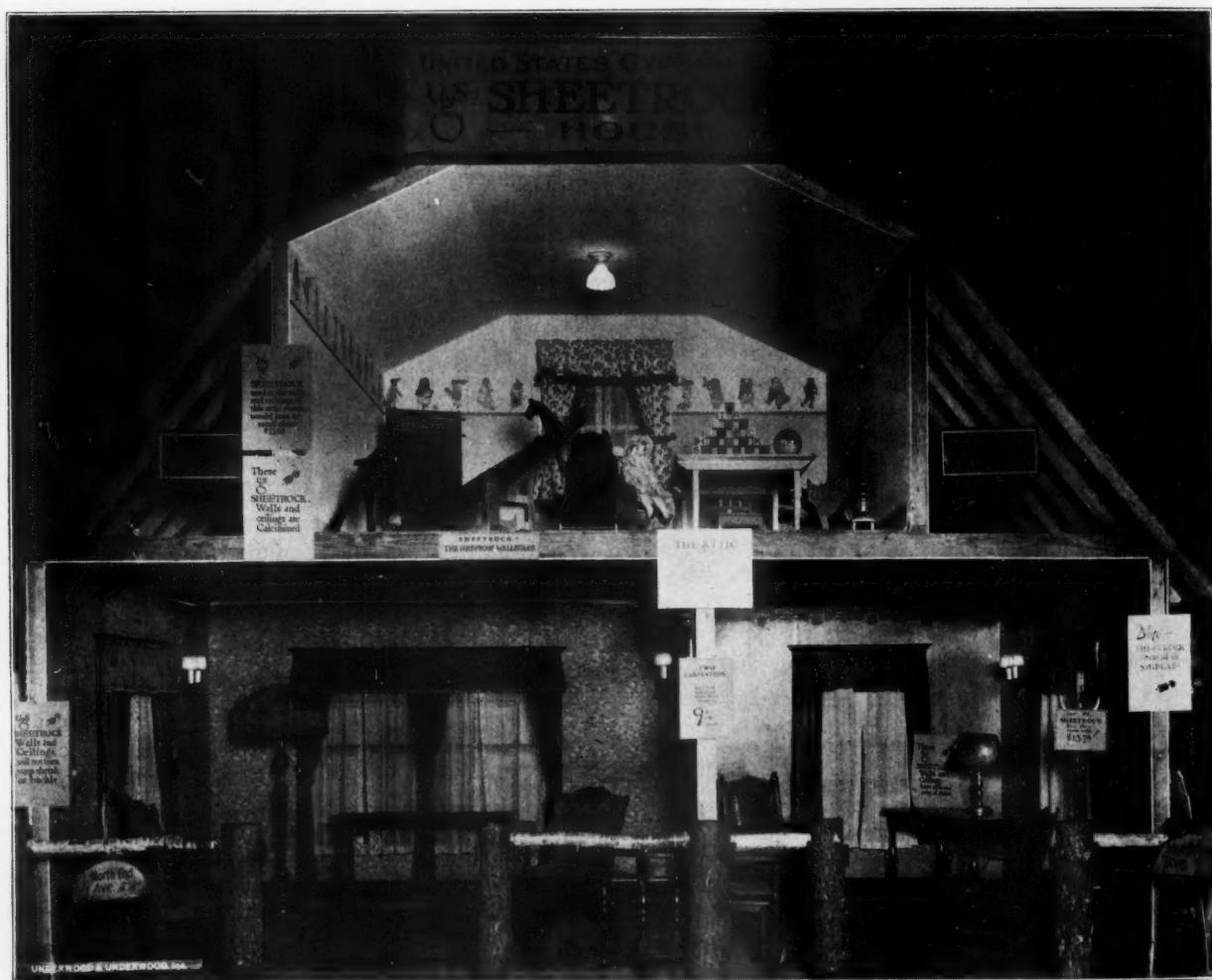


Exhibit of gypsum plaster board by the United States Gypsum Co. at the Chicago "Own Your Home" Show

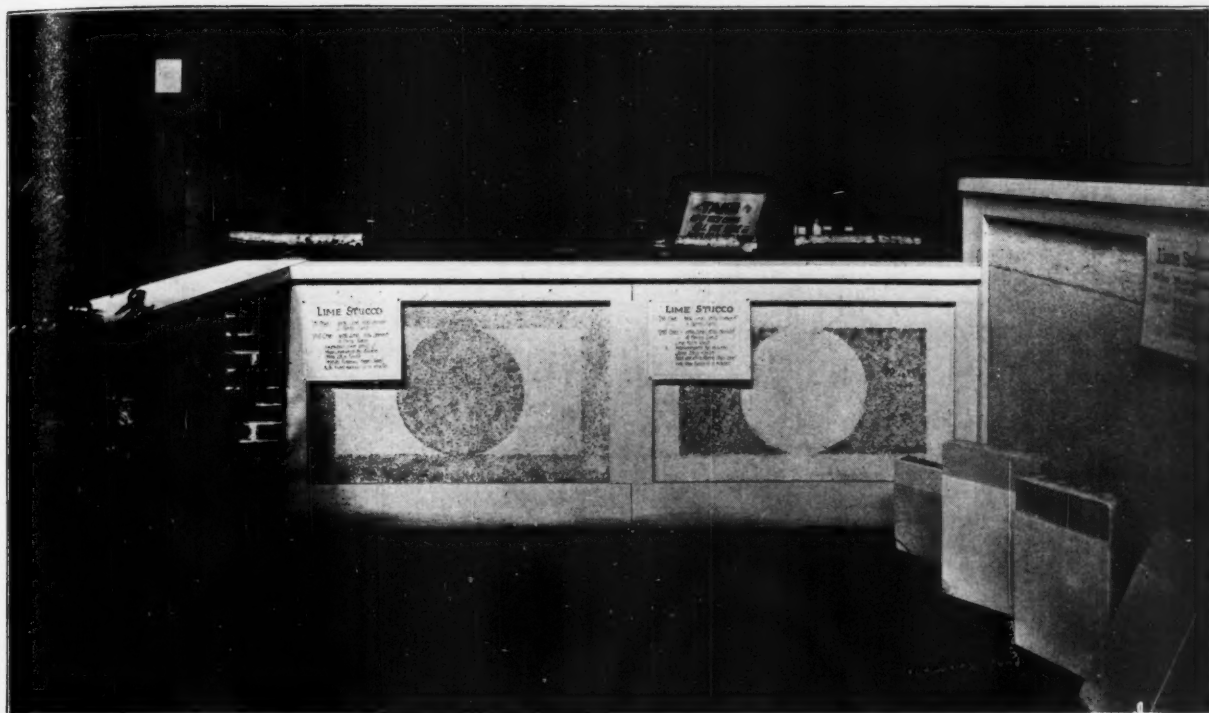
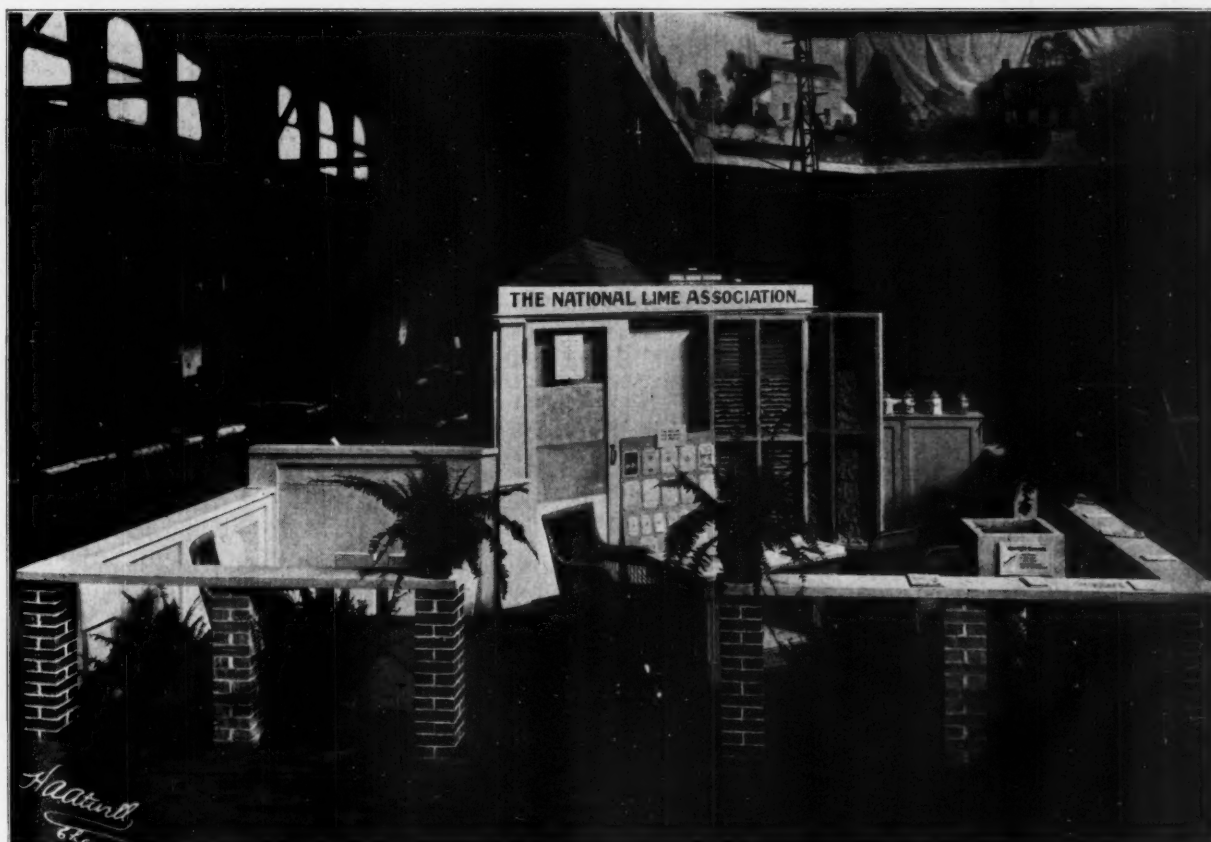


Exhibit of lime stucco by the National Lime Association



Whole exhibit of the National Lime Association showing plaster panels

Wisconsin Railroad Commission Enters Fight for Lower Rates

Wisconsin Mineral Aggregate Association Succeeds in Interesting State Authorities in Urgency of Their Case

REDUCTIONS IN FREIGHT RATES affecting sand, gravel and crushed stone, ranging from 20 to 35 per cent, are strongly urged in an official communication sent by the Wisconsin Railroad Commission to the four railroads of the state on April 6.

The commission points out that the existing rates are causing a "strangulation" of business, particularly construction enterprises, and unless relief comes immediately thousands of men will remain out of employment and scores of industrial plants will be idle.

The commission's official "recommendation" follows on the heels of the request by State Highway Engineer A. R. Hirst that the railroads cut their freight rates on highway material. He told the lines that unless they did reduce their rates he would get under way the opening of local gravel and sand pits throughout the state, doing away entirely with the freighting of materials from established plants. The railroads refused to consider Mr. Hirst's request.

Take Up Fight

Gravel, sand and crushed stone men, organized as the Wisconsin Mineral Aggregate Association, representing practically all state shippers of these products, took up Mr. Hirst's threat and launched a movement for lower rates.

The movement by the aggregate association resulted in a series of conferences between its representatives, railroad officials and members of the railroad commission.

Members of the commission stated on April 6 that an early reply was expected from the four trunk lines, the Milwaukee, the Soo Line, the Northwestern and the Omaha.

The railroad commission, in its communication, set forth a table of rate reductions. This schedule, the commission says, while a material reduction from the present scale, is yet a substantial increase over rates formerly in existence. It is suggested only as a practical solution from a business point of view.

Rates Suggested

These rates as suggested by the commission are:

Five miles, 2.3 cents per 100 pounds; 10 miles, 2.4; 15 miles, 2.5; 20 miles, 2.6; 25 miles, 2.7; 30 miles, 2.8; 35 miles, 2.9; 40 miles, 3; 45 miles, 3.1; 50 miles, 3.2; 55 miles, 3.3; 60 miles, 3.4; 65 miles, 3.5;

70 miles, 3.6; 75 miles, 3.7; 80 miles, 3.8; 85 miles, 3.9; 90 miles, 4; 95 miles, 4.1; 100 miles, 4.2.

There are about 30 commercial gravel pits in the state. These pits supply the greater part of the construction material for highway and paving purposes in Wisconsin. They are running at present at about one-quarter of their capacity.

"We are convinced," the railroad commission declares, "that under such circumstances as presented in this particular matter, wise public policy from every viewpoint would lead to giving the suggestions, as herein contained, speedy consideration."

"Wise Public Policy"

"We are therefore earnestly hoping you may see your way clear to adopt our suggestions and we believe favorable action is in line with wise public policy and calculated to help materially, under the very unusual business and industrial conditions now existing.

"If construction and building can be encouraged under the present circumstances, it will offer some relief to the present unemployment and stagnation. We also believe it will benefit the carriers and do its part in helping through the present crisis."

Construction Probe in Illinois

THE ILLINOIS STATE LEGISLATURE has appointed a committee of seven senators and seven representatives, headed by Senator John M. Dailey, to investigate alleged secret agreements, price "rings" and "hold-up labor tactics" in the building construction industry in Cook County. It has long been claimed that so-called labor agreements exist which effectually shut out all building materials not produced by members of the "ring" and that various abuses have been practiced rivaling or exceeding those disclosed by the Lockwood Committee in New York. Sitzings of the committee began Friday, March 25.

It is planned for the work to proceed in co-operation with the state's attorney's office, the Chicago Police Department, and the United States Department of Justice, that criminal proceedings may be taken at once should anything actionable be disclosed. The committee is armed with full authority to subpoena witnesses and compel the production of any records and papers it may wish to examine.

Illinois Lets Contracts for 15 Miles of Concrete Road

THE STATE HIGHWAY DEPARTMENT of Illinois, on April 5, received bids on and awarded the contract for construction of 14.88 miles of permanent pavement between Elgin and Marengo, at a cost of \$345,000.

On this same stretch of highway bids were received on February 18—46 days ago—and rejected. The low bid then, as now, was submitted by the McCall Construction Co., and totaled \$382,884. So the April 5 figure gives the state a saving of \$37,884, or about \$2,540 a mile.

These figures are exclusive of cement, which the state purchases and supplies to the contractor. Gov. Small, in a statement issued April 5, says the total cost, including cement, will be \$29,975 a mile.

Regarding future prices the governor makes this hopeful prediction: "A new plan adopted in the letting of today's contract and to be followed in the future, will—I am confident—not only make it possible to let contracts at favorable figures, but even reduce the figure of \$29,975 per mile."

He says this plan is a modification of the cost-plus system. The McCall company agrees to build the 14.88 miles of road at cost plus 15 per cent compensation, but in no event to charge more than \$345,000. If the cost plus 15 per cent is less, the state will save.

One reason for the low bid of the McCall Construction Co., it seems, is because this concern owns a gravel pit about midway of the proposed project. This pit will be developed subsequently as a regular commercial plant, it is said.

Cement Workers' Wages Reduced

A WAGE REDUCTION of 10 per cent for all skilled and unskilled laborers has been put into effect by the Missouri Portland Cement Co., St. Louis, Mo., according to H. T. Block, president of the company. About 500 men in St. Louis and vicinity and about 500 more in Kansas City and Memphis are affected.

Concrete Construction Work in St. Louis Shut Down

A SHUTDOWN of all concrete construction work went into effect recently in St. Louis when the cement finishers and other laborers of the industry refused to accept the 20 per cent wage reduction proposed by the Cement Contractors' Association. Nearly 300 concrete finishers and laborers are affected.

The prevailing wage scale is \$1.25 an hour for finishers and \$1.37½ for foremen. For building laborers the scale is 67½ cents per hour, and for concrete laborers 80 cents per hour.



Accident Prevention



Quarry Cars and Haulage— Car Operation

(Prepared for Rock Products by the Engineering
Department of the National Safety Council)

OPERATION IS PROBABLY RESPONSIBLE for most haulage accidents in quarries, it appears from investigations conducted by the National Safety Council.

Loading at the Face

For convenience let us first assume that the car is at the loading face or loading chute. Many injuries have occurred at the loading face because the cars were not properly blocked or choked. Where the track is not level the car should be securely propped to keep it from shifting. In quarries where the cars are usually loaded with several inches of topping the quarry workmen should be warned of the importance of trimming the load before car is allowed to leave the loading track. Cars carelessly loaded drop rock along the track, which litters up the haulage ways and is liable to derail cars. Falling rock may also injure men walking along the tracks.

Loading at Chutes

It is a common practice at some plants to load the rock into cars from chutes which project into the haulage ways. Many injuries have occurred because lumps of rock have fallen over the sides or ends of cars onto workmen's feet. End boards should be provided for use on cars being loaded at chutes. The safer practice, where single cars are loaded, is to stand at the side of chute (the end of the car). Where trains of cars are loaded this practice may not be feasible and it may therefore be necessary to load from opposite side of train, in front of chute. In either case, substantial boards should be provided to keep rock from falling over car body. Care should be taken that lumps of rock do not overhang the car body. It is bad practice to overload the cars. The car should be carefully trimmed and chunks securely placed so they will not fall.

Weged Chutes

Sometimes the rock gets clogged up in the chute and it is necessary that trammers bar it down, or, if this is not possible, a small piece of dynamite is placed under the wedged pieces of rock to shoot it down. Great care is necessary while barring down rock that is wedged. No one should stand in front of the chute while doing this work. It is even more dangerous to shoot (with dynamite) this wedged material, and trammers should not be permitted to do this work. Only experienced men should be allowed to handle dynamite. Under no condition should one climb into a chute to

place the charge. The dynamite should be tied on end of a stick and put into position from a place of safety.

A double pointed bar should not be used in loading at chutes. A bar pointed at one end and blunt at the other is safer for this purpose. The loaders should make sure that chute doors are properly closed before leaving them. Close supervision is necessary to prevent careless workmen from taking chances at loading chutes.

Tramming

In tramming cars by hand, the trammers should never start a car by pulling, but should always get at rear end and push. Hand holds, placed on rear of all tramming cars, will prevent many injuries to workmen's hands. Cars should never be left near a switch where they may be struck by passing cars or motor. Trammers should not give a car a push and allow it to drift uncontrolled, but should stay with the car.

Wherever cars must be handled over grades, the National Safety Council recommends that they be equipped with efficient brakes which may be applied by the trammer from rear of car. If men work in pairs, one of them should always precede the car to see that the roadway is clear and to warn other workmen of the approaching car. It has been suggested also that (if cars have no brakes) blocks or skids be provided at intervals along heavy grades, which may be placed on rails in front of a car that might get out of control of the trammer. These blocks or skids should, of course, be placed by the man who precedes the car, only at the signal of trammer who stays with the car.

Dumping

In dumping cars workmen should lift from the hand hold and not from the car bottom, as their hands may become pinched between the bottom of the car and the truck. When refitting car body on a truck they should keep their feet off the truck or else their feet may be mashed between the bottom of the car and the truck.

Wherever cars are dumped off the end of a trestle or over a filling, it is of prime importance that the track stop or bumper be substantial and well secured in place. The cars are run against the block which stops the truck, and the car body, being unlatched just as block is reached, dumps the load forward. This practice, while followed in many cases, would appear to subject the cars to excessively rough treatment, though it does not necessarily present any hazard except that of cars going over the dump. Probably the best arrangement for holding the cars is the goose-neck dumping block which holds the car wheels so that truck

cannot go over. Where this is not in use, a workman may be pulled over with a car in attempting to prevent the car from going over. Some companies use a chain or cable fastened across track at such dumps and a proper height to catch the car body when in dumping position. A good type of block is a tie extending across both rails and secured either to walls or to posts securely imbedded in the ground. The practice of anchoring block to the track ties puts a severe strain on the track and is not recommended.

Where the chute opening is between rails of track a substantial hinged door should be provided for the opening. This door should always be kept closed except when car is in position for unloading. Substantial doors or grizzlies should also be provided over chute openings for side-dump cars. These chutes should be kept always covered or else railed off so that workmen will not walk into open chutes.

Hauling with Mules

The National Safety Council has found that many accidents with mule haulage are due to mistreatment of the mules. Drivers should not be permitted to handle the animals roughly, as much better work will be done if they are carefully handled and treated with consideration. A mule, if afraid of the driver, is much more liable to run away and by doing so may derail cars, injure himself, or run into other cars or trains. A nervous mule will often start up unexpectedly and the hands of driver may be caught while he is making a coupling.

Power Haulage

Coupling Cars—Cars should not be coupled or uncoupled while in motion. If this rule is always followed many accidents to men making couplings will be avoided. If the cars have properly designed dumpers of sufficient length and a coupling which can be made without reaching between bumpers, accidents from this cause will be largely eliminated.

(To be continued)

Ten Dollars Per Year

THIS ACTIVE INDIVIDUAL MEMBERSHIP plan has been recently made available to you through a change in the constitution and by-laws of the National Safety Council.

National Safety Council
Co-operative Non-Commercial
168 North Michigan Ave., Chicago

New Machinery and Equipment

New Type Air Separator

THE CONSTANTLY increasing demand for very finely ground minerals such as silica, talc, limestone, graphite, etc., has led to some really remarkable developments in the field of air separation. One of the newest is the Model 21 Emerick machine, illustrated herewith. (The standard Emerick air separator was described in detail in *Rock Products*, January 1, 1921.)

This new model is designed for 300-mesh material and finer, such as required for the paint trade, as described in the series of articles now running in *Rock Products*. It has also been found very successful in the graphite industry and in the rock phosphate industry, giving a product, it is claimed, 99½ per cent through a 300-mesh.

Principle of Air Separation

Some 20 years ago, George Emerick brought out the hollow-shaft, double-shell separator, in which the material was spread by a distributor plate in the inner shell, or separating chamber, and a current of air drawn through the material by a fan deposited the finer material in the outer shell or separating chamber. Various forms of dampers, as well as variations in speed were used to regulate the velocity of the air current. These machines are known as low

velocity air separators as the air moves at a comparatively low speed.

The high velocity air separator lifts material from a casing, wherein it is spread by some convenient means and either sucks or blows the dust-laden air into a cyclone dust collector. In both types the velocity is depended upon to regulate the product and practically all separators follow very closely the lines of the two mentioned above.

Slight changes in fan speed, variation in shape of particles and the slight difference in size and weight of grains close to the desired line of separation has made close sizing almost impossible with only the single factor of air velocity to regulate, for even in comparatively small areas the velocity will be greater in one zone than in another.

The manufacturers of the Emerick separator claim that in their new air separator they have solved the problem, by introducing a positively operated centrifugal sizing action, the separating force of which is adjustable relatively to the lifting air current, but once adjusted maintains the same relation at all separator speeds and consequently produces a uniform product.

As centrifugal force operates on well-known fixed laws, it is said to be a simple

matter to balance these forces to remove any desired particles and reject those that are larger, thus insuring a uniform product.

As the separation is not affected by the velocity of the lifting air current, this may be increased greatly, giving larger outputs than can be obtained from separators which depend on the velocity of the lifting current to separate the material.

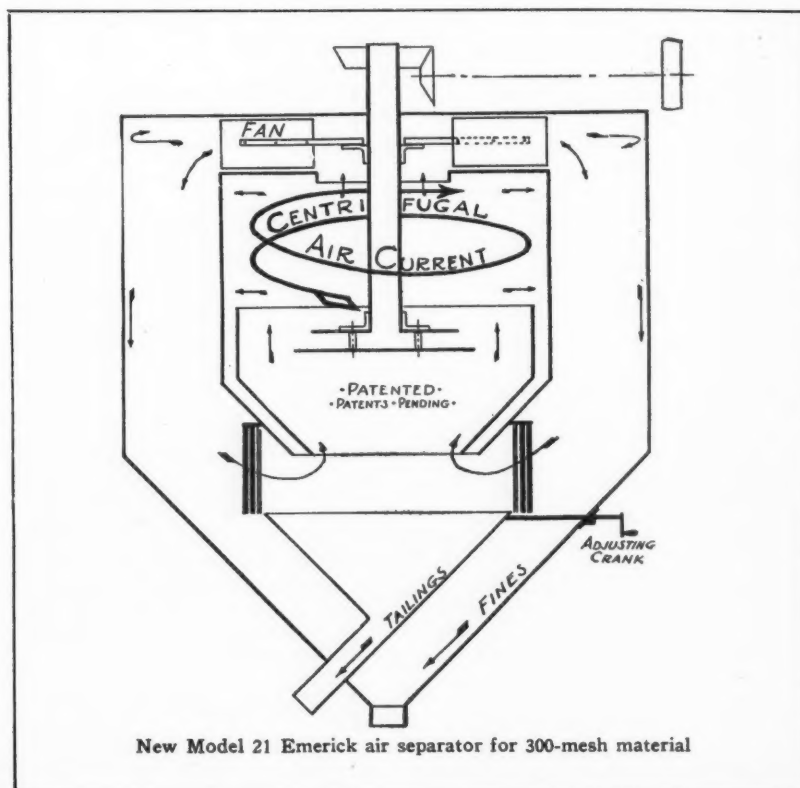
This machine can be used with all types of grinding mills, improving both the capacity and fineness of product and is particularly well suited for improving the fineness of ground material in plants where screens are used, this applies to both internal mill screens and external screens.

Motor Truck Transportation

WE ARE RAPIDLY approaching the time when the issue must be met as to whether the motor truck, as an instrumentality of freight transportation, must be subject to regulation and pay for the upkeep of the roads it uses. Up to this time, with the railroads unable to function satisfactorily, the country has welcomed any help and has been glad enough to see the motor trucks doing their bit without insisting that they should pay for the privilege of doing it. But, as the railroads become more adequately equipped—through the more liberal policy in the matter of rates—to do the freight business of the country, they themselves are likely to raise the question of the right of the motor trucks to compete with them without being subject to regulatory law and without contributing specifically to the upkeep of the highways in consideration of their being permitted to use these hitherto free substitutes for rails and private rights of way.

In a discussion of some phases of this matter, R. E. Fulton, of the International Motor Company, says:

"Every dollar spent to build adequate highways is an investment in lower commodity prices. On the other hand, any unjustified restriction or discouragement to economical hauling such as that offered by larger capacity trucks, is just as poor business as to handicap railroad freight transportation. And, unfortunately, most of the legislative effort along this line has been unjustified since it has been based on the mere assumption that large capacity trucks wear out the roads simply because they are heavier. Legislators fail to realize that the use of trucks of half capacity for the same loads means two trucks instead of one and therefore more trucks on the highway as well as far greater costs for the transportation



New Model 21 Emerick air separator for 300-mesh material

of goods. And even then, road wear would be increased because the use of lighter trucks means higher speed and the degree of road wear is proportionate to the rate of speed. More important still is the fact that the weight of vehicle in proportion to carrying capacity decreases as the size of the truck increases. Therefore, when several smaller trucks are used instead of a single large truck, the roads are forced to hold a far greater amount of useless vehicle weight which adds to road destruction." — "Traffic World."

Rubber Lined Sand Pumps

By W. W. HUMPHREY
Engineer, Hydraulic Department, Allis-Chalmers
Mfg. Co., Milwaukee, Wis.

RAPID WEAR OF SAND pumps and launders in western ore mills has been the cause of much lost time and considerable expense both for repair parts and necessary labor for these changes. This trouble has led to experimenting in the comparative wearing qualities of different metals and materials used in sand pump construction. Very satisfactory results were obtained with pieces of old rubber belting used at the turns in the launders and even as patches on the worn out iron pump casings. This use of rubber to resist the abrasive wear of sand led to investigations which ended in the patent, design and manufacture of the modern soft rubber-lined sand pump.

The present design of these pumps uses pressed steel plate liners which are themselves lined with rubber and a cast iron runner core covered with rubber. The rubber is cured and vulcanized by means of large molds which may be placed in the standard tire presses of the larger rubber companies.

As was to be expected, some trouble was experienced at first in making the rubber adhere to the metal. However, the rubber companies have done considerable experimenting along this line and are now

able to obtain excellent adhesion of the rubber to the metal. It has also been found that the rubber must be of a very soft grade since its superior wearing qualities depend on its greater resiliency as well as its resistance to being cut. Due to lack of experience both in design of molds and the application of rubber, the progress in this new development has been somewhat slow. The experience gained has, however, resulted in the construction of what is believed to be a very marked improvement in sand pump design.

The rubber parts are not the only variation from the present sand pump design which have been included in this new pump. One of the marked departures from the present design of sand, or other centrifugal pumps, has been the use of ball bearings and the total elimination of the usual babbit bearing or metal bushings. This was deemed necessary since the large-size ball bearing is the only satisfactory means of taking care of the unbalanced thrust caused by the special design of the runner. The use of this extra heavy ball bearing also permits overhanging the runner, thereby eliminating the usual bearing bushings in the stuffing box, which have always been the source of considerable wear. The bearings are so adjusted that there will be no axial play of the shaft, which permits of allowing close clearances between runner and liners. The bearings are protected by means of thick felt dust rings and need only to be supplied with a good grade of bearing oil occasionally. The bearing housings are included in the one-piece pedestal casting, thereby allowing perfect aligning and rigidity. For belt-driven units this pedestal may be bolted direct to foundation while for direct driven units it may be assembled on common base with motor or similar driving units.

Up to the present time these pumps have been used only for conveying the finer sands and slimes in mining mills. In one trial installation in Utah one of the first pumps put in service was run 53 days in

the same service in which iron-lined pumps lasted six or eight days only. At the close of this trial the rubber parts showed only slight signs of wear and were used for trial purposes at other plants.

It will thus be seen in installations of this kind, where there is a small percentage of acid in the solution, the rubber-lined pump has already proved successful. Where there is no acid in the solution, however, such difference in life in favor of the rubber-lined pump cannot be expected. Up to the present time sufficient trials have not been made upon which to base a valuable comparison concerning the respective wearing qualities.

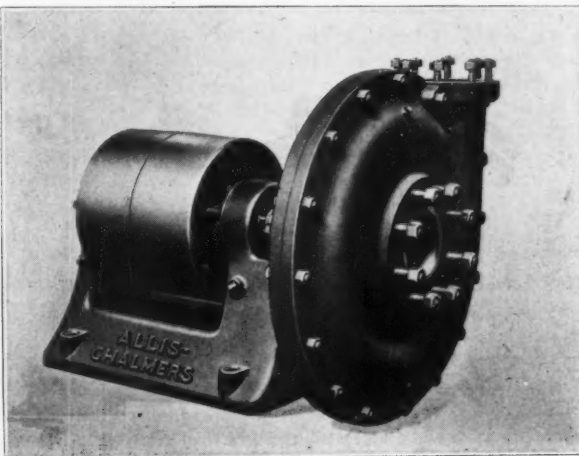
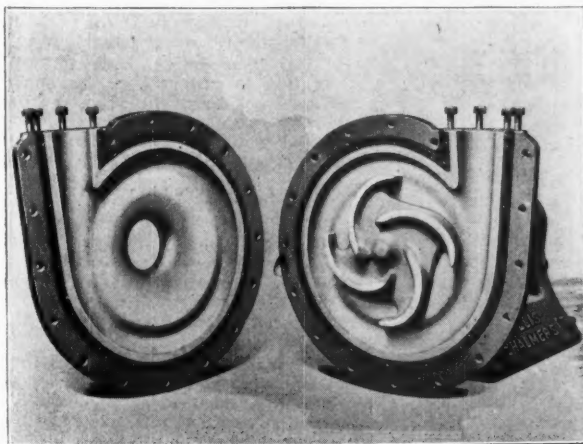
Although this pump is still in its experimental stage, prospects are bright for a large and varied field for its use. Development of a closed runner will solve the problem of pumping coarse sands and gravels. Diluted acid solutions containing abrasive materials will also provide a wide field of service for this pump, since by changing its compound for different acids, the rubber will be able to withstand the erosion of the acid and be soft enough to withstand the attack of the abrasive.

Buyer for Crushed Clamshells

THE DURA-STONE STUCCO CO., Danville, Ohio, wants to buy crushed clamshells in carload lots. The mail address of this company is Buckeye City, Ohio. C. M. Drake is general manager.

California Bill Authorizes Community Owned Plants

A BILL passed in the California Assembly lately authorizes communities, either separately or jointly, to establish plants and manufacture cement, and to maintain rock quarries, the output to be used solely by the counties operating the plants. The bill was passed by a vote of 52 to 10.



Allis-Chalmers new soft-rubber lined sand pumps—experimental type



General Market News



Conditions in Lehigh Valley Cement District

THE PAST FORTNIGHT shows an encouraging trend in the cement industry in the Lehigh Valley district of Pennsylvania. Shipments of material noticeably are on the increase, and plants are gradually working upwards towards normal. The current distribution from this section is now approximately 70 per cent of regular output, and with every indication pointing to a higher average at an early date. Idle machinery is growing less and less, and the spring season is opening up far brighter than anticipated a few months ago. Labor is plentiful and existing wage scales are at a point that allows a reasonable quotation in accord with the trend of the times.

The cement markets of the Eastern part of the country show little change in the matter of quotations, but decided change in the line of demand. Calls for material show increasing strength, and the tendency is growing to a point of immediate orders rather than a hesitancy, as so marked in the past few months. Dealers, likewise, are losing a reticence in placing orders, and a fair amount of stocking up in anticipation of spring business is under way. Prices of cement at New York maintain at \$4.10 a barrel, delivered on the job, with bag rebate of \$1, or 25 cents a bag; in this latter connection it is expected that a reduction in bag charges will be announced at an early date, although local dealers are so well stocked it is likely that the change will not be made before a reasonable date. The call for the material in this section is primarily from the suburban districts, where a fair amount of new housing work is about to go forward.

Cement at Boston, Mass., is quoted by dealers at \$4.75 a barrel, a reduction of 25 cents since the last issue of *Rock Products*; the bag rebate is 25 cents. In paper, the material is being turned at \$4.15 a barrel. Providence, R. I., is holding to a \$5 level, with a total bag rebate of \$1.25 per barrel. Building disturbances with labor in the New England districts are bringing about a much reduced call for cement and other building materials.

New Jersey prices for cement are much the same as those at New York; at Newark the level is about \$4.50, including bags, delivered on the job, while at Trenton dealers are asking \$4.60 with bags. Philadelphia, Pa., is showing a shade higher in prices, while at Pittsburgh \$4.20 is being asked.

In a recent statement the Atlas Port-

land Cement Co., Northampton, Pa., sets forth that its present average selling price today is below the \$1.91 average figure per barrel, shown by 1920 records of the United States Geological Survey. It is pointed out that during the past year the increased cost of production was about 30 cents a barrel over the manufacturing costs as prevailed in the fall of 1918. This was made up of a labor advance of 46 per cent, coal 20 per cent, and materials and supplies 23 per cent. The net income of the Atlas company in 1920 was considerably below 10 per cent of its capital invested in 1920.

All of the larger cement companies are resuming operations on a larger scale in the Lehigh Valley section. The Alpha Portland Cement Co. is operating under fair output at its Martin Creek works. The Lehigh Portland Cement Co. continues production at its different mills at Ormrod and vicinity, without any immediate thought of curtailment; the mills at Coplay and Fogelsville are also in service. The Atlas Portland Cement Co. is engaging under fair manufacture at its various plants in this district, while the smaller companies are either operating or arranging for resumption at an early date.

A bomb was exploded at the entrance to the plant of the Crescent Portland Cement Works, Wampum, near New Castle, Pa., on March 31. No explanation of the occurrence has been made, excepting an expressed opinion that the explosion was premature and parties implicated intended to do greater damage. The company does not hold to the belief that there was any intention to destroy the plant. The bomb was of faulty manufacture and indicated the work of amateurs.

The Castalia Cement Co., Castalia, Ohio, near Youngstown, has resumed operations at its local mill, giving employment to about 150 men. The plant has been idle since November.

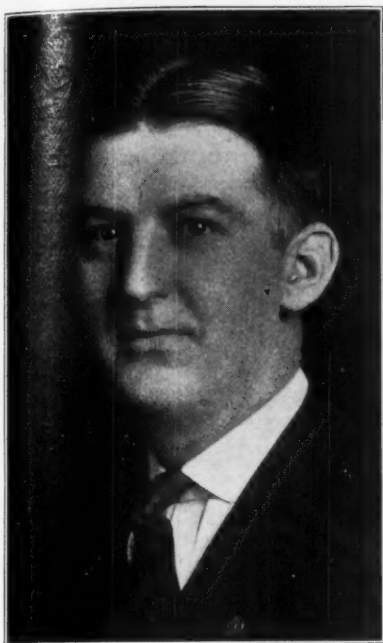
Transportation Problems

FRANCIS B. JAMES, the well-known traffic attorney of Washington, D. C., who has been retained by the National Association of Sand and Gravel Producers to represent it in matters of freight rates and transportation, has published a 58-page booklet on "Some Phases of the Transportation Problem." This is a reprint of the address he delivered at the January convention of the National Association at Louisville, Ky., and contains much of interest to the sand and gravel industry.

Calder Committee's Recommendations for Revival of Construction Industry

THE FINAL REPORT of Senator Calder's Committee on Reconstruction and Production, upon which producers of building materials at one time pinned considerable faith, was issued from Washington, March 3. A good deal of the report is now ancient history, but the difficulties blocking resumption of construction work still exist, and the committee's recommendations for overcoming these are as follows:

- (1) A bill to establish in the Department of Commerce a division for the gathering and dissemination of information as to the best construction practices and methods, technical and cost data, and matters relating to city planning, etc., in order to encourage standardization and improved building practices throughout the country.
- (2) A bill to provide for the gathering and publication by existing governmental agencies of current facts as to production, distribution, available supplies, standards of quality, costs and realization of coal.
- (3) An amendment to the transportation act directing the Interstate Commerce Commission not to declare without hearings an emergency which will give preference of priority in transportation.
- (4) An amendment to the Federal Reserve Act to permit the Federal Reserve Board to direct the use of savings and time deposits of national banks for long-time loans, thus giving such deposits greater security and supplying a source of long-term money for home building.
- (5) A home loan bank bill to provide for district home loan banks which may sell, under federal supervision, bonds secured by the aggregated loans deposited by the member banks.
- (6) An amendment, limited to five years, to the Revenue Act of 1918, to provide for the exemption from excess profits and income taxes of the profits on the sales of dwelling houses where such profits, plus an equal amount, are reinvested in dwelling house construction.
- (7) An amendment to the Revenue Act of 1918 to exempt from taxation interest on loans up to \$40,000 on improved real estate used for dwelling purposes, when such loans are held by an individual.
- (8) An amendment to the Revenue Act of 1918 limiting the taxation of profits from the sale of capital assets by providing for their taxation as of the years of accrual rather than as of the year of their sale.
- (9) An amendment to the Revenue Act of 1918 to limit the surtax upon saved income to an amount not in excess of 20 per cent of such income.
- (10) An amendment to the postal savings law increasing the limitation on deposits as to amount and time and authorizing the rate of interest to be changed from time to time and providing for compensation of postmasters for the extra duties.



Ben Stone

Ben Stone Leaves Illinois Concrete Aggregate Association

BEN STONE, one of the leading characters in the Mid-West sand and gravel industry, has become the general manager of an Indiana plant. He resigned his position as executive secretary of the Illinois Concrete Aggregate Association, effective April 1, to take over the management of the Merom Sand and Gravel Co., Merom, Ind.

This company is not only a large producer of sand and gravel, but the proprietor of a 600-acre farm, which comes under the new general manager's jurisdiction. The principal office of the company is in Indianapolis.

Mr. Stone's work with the Illinois Sand and Gravel Producers' Association and its recent successor, the Illinois Concrete Aggregate Association, is well known to readers of *Rock Products*, and they will surely join in the well wishes of his former associates for the success of his new venture.

Mr. Stone is a former railway traffic man and his assistance in matters of traffic and freight rates was of particular value to the members of his association.

To Develop Agricultural Gypsum Deposit

H. W. DYKE, secretary of the Imperial Valley Sand and Gravel Co., Imperial, Calif., informs us that his company is beginning development work on a small deposit of gypsum, which will be used for land plaster, or agricultural gypsum.

A Progressive Concern

ABUSY SEASON in Salem, Ore., is evidently expected by the Oregon Gravel Co., which is now engaged in making repairs and additions to its plant. It is now completing a 900-ft. railroad spur track costing about \$5,000.

The company is also installing a gyratory crusher of 150 cu. yds. per day capacity and will soon add a 36x16-in. roll crusher to reduce boulders to sand, if desired. In the near future a Shope concrete-brick plant will be erected and a new industry added to the activities of this concern.

Central Bureau of the National Lime Association

C. O. DOWDELL is the field secretary of the Central Bureau of the National Lime Association. This district of the association includes the Middle West territory, centering around St. Louis, Mo., where the bureau offices are.

Mr. Dowdell is the former assistant general manager of the Security Cement and Lime Co., Hagerstown, Md., in charge of plant operations. He is a civil engineering graduate of Armour Institute of Technology, Chicago.

Mr. Dowdell is peculiarly well equipped for his new work, not only by his genial and pleasing personality, but through several years' experience in engineering construction work with the City of Chicago, the U. S. Bureau of Public Roads and during the war with the Ordnance Department of the U. S. Army.

At present Mr. Dowdell has interesting and varied duties to perform in the promotion of lime in the construction, chemical and agricultural fields.



C. O. Dowdell



J. D. Pierce

New Secretary of the Illinois Concrete Aggregate Association

J. D. PIERCE, of Chicago, is the new executive secretary of the Illinois Concrete Aggregate Association, succeeding Ben Stone, whose resignation is noted elsewhere.

Mr. Pierce is a trained association secretary. Originally he was a business man with manufacturing experience. He organized the National Association of Bedding Manufacturers, and in 3½ years increased its membership from the original 40 to 214. He devised a zone system of membership which kept the locals busy and interested in national affairs as well.

Mr. Pierce also built up a traffic association among furniture manufacturers. He is president of the Business Secretaries Forum of Chicago, composed of association managers.

Mr. Pierce lives in Winnetka, a north shore suburb of Chicago, where he is president of the Winnetka Civic Association. He is also a council member of that city.

Nova Scotia Gypsum Production

FROM a report on the mines of Nova Scotia for the year ended September 30, 1920, it is learned that there was an increase in the production of gypsum of 142,820 tons over the previous year, the total output amounting to 191,670 tons. Practically all of this production was exported to the United States.

The Rock Products Market

Wholesale Prices of Crushed Stone

Prices given are per ton, F. O. B., at producing plant or nearest shipping point

Crushed Limestone							
City or shipping point	Screenings, ¾ inch down	¾ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger	
EASTERN:							
Blakeslee, N. Y.	1.00	1.00	1.50	1.50			
Buffalo, N. Y.			1.35 per net ton, all sizes				
Burlington, Vt.	1.00		2.50	2.00	2.00		
Califon, N. J.	1.80	2.25	2.00	1.80	1.80		
Chaumont, N. Y.	1.75	1.75	1.75	1.50	1.50		1.50
Cobleskill, N. Y.	1.35	1.35	1.25	1.25	1.25		
Coldwater, N. Y.	1.80	1.80	1.80	1.65	1.65	2.00@2.25	
Eastern New York	.90	1.80	1.70	1.60	1.60	1.50	
Eastern Penna.	1.00		1.85	1.85	1.85	1.85	
Grove, Md.	1.45	2.50	2.40	2.00	1.60	1.45	
Munns, N. Y.			All sizes 1.50				
Utica, N. Y.	1.00		All other sizes 1.50				
Walford, Pa.	1.25	1.75	1.75	1.75	1.75	1.75	
Western New York	.70	1.25	1.25	1.25	1.25	1.25	
CENTRAL:							
Alden, Ia.	.80@1.00	.80@1.00	1.50	1.45			
Alton, Ill.	2.25	2.25	1.75	1.75			
Bettendorf, Ia.		All sizes, 2.00 cu. yd. f.o.b. quarry					
Buffalo, Ia.	1.00	1.35	1.45	1.25	1.35	1.35	
Chicago, Ill.	1.40	1.60	1.40	1.40	1.40	1.40	
Cincinnati, Ohio		2.00	2.00	2.00			
Columbia, Ill.	2.15	1.90	2.00	2.00	1.90	1.90	
Coralville, Ia.	1.25	1.65	1.65	1.50	1.40		
Davenport, Ia.	1.50*	1.50*	1.50*	1.50*			
Dundas, Ont.	1.00	1.50	1.50	1.50	1.25	1.20	
Eden and Knowles, Wis.	1.30	1.30	1.30	1.30	1.30		
Greencastle, Ind.	1.50	1.40	1.25	1.25	1.25	1.25	
Illinois, Southern	2.00	1.75	1.75	1.75	1.75		
Kokomo, Ind.	1.10	1.25	1.25	1.10	1.10	1.10	
Krause or Columbia, Ill.	1.80	1.30	1.50	1.40	1.30	1.30	
Lannon, Wis.	1.00	1.10	1.10	1.10	1.10	1.10	
Lima, Ohio	1.70	1.60	1.50	1.50	1.50	1.50	
Linwood, Ia.	1.00		1.45	1.25	1.25		
Marblehead and Brillion, Wis.	1.10		1.20	1.10	1.10		
Mayville, Wis.	.95@1.00		1.20	1.20	1.20	1.20	
Montrose, Ia.	1.35	1.75	1.75@1.85	1.75	1.65@1.75		
Oshkosh, Wis.			1.40 per ton, all sizes				
River Rouge, Mich.	1.25	1.50	1.50	1.50	1.25	1.25	
St. Louis, Mo.	.60	1.60					
Sheboygan, Wis.	1.30	1.30	1.30	1.30	1.30	1.30	
Stolle, Ill. (I. C. R. R.)	2.25		1.75	1.75	1.75	1.75	
Stone City, Ia.	.80		1.60	1.50	1.40		
Toledo, Ohio, f. o. b. cars	1.85	2.10	2.10	2.10	1.85	1.85	
Toronto, Canada	1.90	2.40	2.40	2.40	2.15	2.15	
SOUTHERN:							
Cartersville, Ga.		1.85		1.75	1.75	1.65	
Chickamauga, Tenn.	1.50	1.75	1.75	1.75	1.75	1.75	
Columbia, S. C.	1.00@1.25	3.50	3.50	3.50			
El Paso, Tex.	1.00	1.00	1.00	1.00	1.00		
Fort Springs, W. Va.	1.45	1.60	1.80	1.65	1.45		
Garnett, Okla.	.50		1.60	1.60	1.45		
Ladds, Ga.	1.75	1.75	1.75	2.00	2.00		
Mascot, Tenn.		1.50	2.00		1.50@2.00		
New Braunfels, Tex.	.60	1.50	1.50	1.25	1.25	1.25	
WESTERN:							
Atchison, Kans.	.50	2.10	2.10	2.10	2.10	2.10	
Blue Springs and Wymore, Neb.	.20	1.65	1.65	1.60@1.65	1.45@1.50	1.40	
Cape Girardeau, Mo.	1.50		1.50	1.50	1.25		
Kansas City, Mo.	1.00	2.00					

Crushed Trap Rock

City or shipping point	Screenings, ¼ inch down	¾ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger	
Baltimore, Md.	1.25	2.50	2.35	2.25	2.00@2.25	2.00	
Bernardsville, N. J.	2.00	2.20	2.00	1.80	1.50		
Brantford, Conn.	.80	1.95	1.80	1.60	1.40		
Birdsboro, Pa.	1.40	1.90	1.80	1.60	1.60	1.40	
Bound Brook, N. J.	2.00	2.30	2.10	1.75	1.75		
Dresser Jct., Wis.	1.00	2.45	2.45	2.15	2.00	2.00	
Duluth, Minn.	.75@1.00	2.25	1.90@2.00	1.40@1.50	1.40@1.50	1.50	
Dwight Station, Calif.			.75@1.00—all sizes				
E. Summit, N. J.	2.10	2.35	2.15	1.75	1.85		
Eastern Mass.	.60	1.95	1.75	1.50	1.50	1.50	
Eastern Penna.	1.60	2.25	1.95	1.80	1.80	1.75	
New Britain, Middlefield, Rocky Hill, Meriden, Conn.	.60@1.00	1.60@1.80	1.60@1.80	1.40@1.50	1.20@1.30		
Oakland, Calif.	1.10	1.10	1.10	1.10	1.10	1.10	
Richmond, S. C.—Granite	.50*		1.75*	1.50*	1.50*		
San Diego, Calif.	.50@.70	1.45@1.75	1.40@1.75	1.30@1.60	1.25@1.55	1.25@1.55	
Springfield, N. J.	2.15	2.35	2.15	2.00	1.85	1.75	
Westfield, Mass.	.60	1.35	1.30	1.20	1.10		

Miscellaneous Crushed Stone

City or shipping point	Screenings, ¼ inch down	¾ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger	
Baltimore, Md.—Gneiss	1.00	2.75	2.40	2.20	2.10	1.75	
Columbia, S. C.—Granite	.75		2.75	2.50	2.35		
Dundas, Ont.—Flint	1.10	1.10	1.10	1.10	1.10	1.10	
Eastern Penna.—Sandstone	1.20	2.00	2.00	1.70	1.70	1.70	
Eastern Penna.—Quartzite	.90	1.70	1.55	1.20	1.20	1.10	
Holton, Ga.—Granite	.40		2.50	2.25	2.25		
Los Angeles, Cal.—Granite		1.25@1.50	1.15@1.40	1.15@1.40			
Middlebrook, Mo.—Granite	4.00		2.00	2.00		1.50†	
Stockbridge, Ga.—Granite	.50	2.00	1.90	1.75	1.75		

*Cubic yard. †Agril. lime. ||R. R. ballast. §Flux †Rip-rap. a 3-inch and less.

Agricultural Limestone

EASTERN:	
Coldwater, N. Y.—Analysis, 56.77% CaCO ₃ , 41.74% MgCO ₃ —70% thru 200 mesh, 95% thru 40 mesh; bags, 5.00; bulk	3.25
Chaumont, N. Y.—Analysis, 95% CaCO ₃ , 1.14% MgCO ₃ —Thru 100 mesh; sacks, 4.50; bulk	2.75
Gasport, N. Y.—90% thru 50 mesh; bags, 4.25; bulk	2.50
Grove City, Pa.—Analysis, 94.75% CaCO ₃ , 1.20% MgCO ₃ —70% thru 100 mesh; 80 lb. ppr., 5.50; bulk	4.50
Grove, Md.—50% thru 50 mesh; paper bags, 6.50; bulk	4.50
Hillsville, Pa.—Analysis, 96% CaCO ₃ —70% thru 100 mesh; sacks, 5.00; bulk	3.25
Jamesville, N. Y.—Analysis, 89.25% CaCO ₃ , 5.25% MgCO ₃ ; sacks, 4.50; bulk	2.75
New Castle, Pa.—85% CaCO ₃ , 1.4% MgCO ₃ —75% thru 100 mesh, 84% thru 50 mesh, 100% thru 4 mesh; sacks, 5.00; bulk	3.25
Syracuse, N. Y.—Analysis, 90% carbonates—50% thru 100 mesh, 90% thru 50 mesh; sacks, 3.50; bulk	2.75
Texas, Md.—Analysis, 58.02% CaCO ₃ , 37.3% MgCO ₃ —50% thru 50 mesh; bags, 4.25; bulk	2.50
Walford, Pa.—50% thru 100 mesh, 60% thru 50 mesh, 100% thru 10 mesh; sacks, 5.00; bulk	3.25
West Stockbridge, Mass., Danbury, Conn., North Pownall, Vt.—Analysis, 90% CaCO ₃ —90% thru 100 mesh; paper bags, 6.25—90% thru 50 mesh; paper bags, 5.25; bulk	3.25
Williamsport, Pa.—Analysis, 88-90% CaCO ₃ , 3-4% MgCO ₃ —50% thru 50 mesh; bulk	4.00@5.50
CENTRAL:	
Alden, Ia.—Analysis, 99.16% CaCO ₃	.80
Alton, Ill.—Analysis, 96% CaCO ₃ , 0.75% MgCO ₃ —50% thru 4 mesh; Pulverized limestone	4.50
Bedford, Ind.—Analysis, equivalent 98.5% CaCO ₃ —90% thru 100 mesh	1.60@2.00
Belleville, Ont.—Analysis, 90.9% CaCO ₃ , 1.15% MgCO ₃ —45% to 50% thru 100 mesh, 61% to 70% thru 50 mesh; bulk	2.50
Cape Girardeau, Mo.—Analysis, 90% CaCO ₃ , .044% MgCO ₃ —50% thru 4 mesh	1.50
Chicago, Ill.—Analysis, 53.63% CaCO ₃ , 37.51% MgCO ₃ —90% thru 4 mesh	1.50
Columbia, Ill., near East St. Louis—¾-in. down	1.25@1.80
Detroit, Mich.—Analysis, 88% CaCO ₃ , 7% MgCO ₃ —75% thru 200 mesh, 2.50@4.75—60% thru 100 mesh	1.80@3.80
Elmhurst, Ill.—Analysis, 35.73% CaCO ₃ , 20.69% MgCO ₃ —50% thru 50 mesh	1.25
Greencastle, Ind.—Analysis, 98% CaCO ₃ —50% thru 50 mesh	2.00
Howenstein, O.—100% thru 10 mesh, 89% thru 50 mesh, 39% thru 100 mesh	2.75@3.00
Lannon, Wis.—Analysis, 54% CaCO ₃ , 44% MgCO ₃ —90% thru 50 mesh	2.00
Marblehead, O.—Analysis, 83.54% CaCO ₃ , 14.92% MgCO ₃ —52.4% thru 100 mesh, 59% thru 50 mesh, 100% thru 10 mesh; sacks, 5.25; bulk	3.00
Mascot, Tenn.—Analysis, 52% CaCO ₃ , 38% MgCO ₃ —80% thru 100 mesh, bulk	2.75
100% thru 10 mesh, bulk	2.25
80% thru 200 mesh, bulk	4.50
Mayville, Wis.—Analysis, 53.65% CaCO ₃ , 43.72% MgCO ₃	1.75@2.00
McCook, Ill.—Analysis, 54.10% CaCO ₃ , 45.04% MgCO ₃ —100% thru ¾-in. sieve, 78.12% thru No. 10, 53.29% thru No. 20, 38.14% thru No. 30, 34.86% thru No. 50, 22% thru 100 mesh	1.50
Milltown, Ind.—Analysis, 91.59% CaCO ₃ , 4.87% MgCO ₃ —24% thru 200 mesh, 33.6% thru 100 mesh, 40% thru 50 mesh, 50% thru 40 mesh, 70% thru 20 mesh	1.65
Mitchell, Ind.—50% thru 100 mesh	2.00
Montrose, Ia.—90% thru 100 mesh	1.25
Narlo, O.—Analysis, 56% CaCO ₃ , 43% MgCO ₃	1.25
Piqua, O.—Analysis, 82.8% CaCO ₃ , 8.2% MgCO ₃ ; neutralizing power in terms of calcium carbonate, 95.3%—50% thru 100 mesh	3.50@5.50
50% thru 50 mesh	1.75@2.00
Ridgeville, Ind.—Analysis, 98% CaCO ₃ —100% thru 4 mesh	1.75

(Continued on next page.)

Agricultural Limestone

(Continued from preceding page.)

River Rouge, Mich.—Analysis, 54% CaCO ₃ , 40% MgCO ₃ ; bulk.....	.80@1.40
Stoll, Ill., near East St. Louis on I. C. R. R.—Thru 1/4-in. mesh. Analysis, 89.61% to 89.91% CaCO ₃ , 1.82% MgCO ₃	2.25
Stone City, Ia.—Analysis, 98% CaCO ₃ , 90% thru 50 mesh.....	.80
Toledo, O.—Analysis, 52.72% CaCO ₃ , 43% MgCO ₃ —20% thru 100 mesh, 30% thru 50 mesh, 80% thru 100 mesh, 100% thru 5/32 screen.....	1.80
Whitehill, Ill.—Analysis, 97.12% CaCO ₃ , 2.50% MgCO ₃ —90% thru 100 mesh.....	5.00
Yellow Springs, O.—Analysis, 96.08% CaCO ₃ , 63% MgCO ₃ —32% thru 100 mesh, 58% thru 50 mesh, 99% thru 10 mesh; sacks, 8.25.....	2.00
SCUTHERN:	
Blowers, Fla.—Analysis, 98% combined carbonates—75% thru 200 mesh.....	5.00
Cartersville, Ga.—Analysis, 96% combined carbonates—pulverized limestone.....	1.75@2.00
Claremont, Va. (Maritime)—Analysis, 90.94% CaCO ₃ , 0.31% P, 1.36% Mg, 0.37% K; 100 lb. paper bags, 6.00; 100 lb. cloth bags, 6.50; bulk.....	3.50@4.50
Dittlinger, Tex.—Analysis, 99.09% CaCO ₃ , .04% MgCO ₃ —90% thru 100 mesh.....	2.00@3.00
Grovania, Ga.—Analysis, 95% CaCO ₃ , no MgCO ₃ —50% thru 100 mesh.....	2.50
Hopkinsville, Ky.—Analysis, 94.6 to 98.1% CaCO ₃ ; bulk.....	2.00
Knoxville, Tenn.—Pulverized.....	2.50
90% thru 100 mesh.....	2.00
90% thru 50 mesh.....	1.50
Ladds, Ga.—Pulverized limestone.....	2.50
Linnville Falls, N. C.—Analysis, 53% CaCO ₃ , 42% MgCO ₃ —50% thru 100 mesh; sacks, 4.50; bulk.....	3.00
Marion, Va.—Analysis, 90% CaCO ₃ —50% thru 100 mesh.....	2.50
Memphis, Jct., Ky.—Analysis, 95.31% CaCO ₃ , 1.12% MgCO ₃ ; average price, 1/4 in. down.....	2.00
Mascot, Tenn.—Analysis 52% CaCO ₃ , 38% MgCO ₃	3.00
80% thru 100 mesh.....	2.50
All thru 10 mesh.....	5.00
80% thru 200 mesh.....	5.00
Paper bags, \$1.50 extra per ton; burlap, \$2.00 extra per ton.....	2.50
Maxwell, Va.—Analysis, 76.6% CaCO ₃ , 22.83% MgCO ₃ —100% thru 20 mesh; 100 lb. ppr., 7.00; bulk.....	5.00
Ocala, Fla.—Analysis, 98% CaCO ₃ —75% thru 200 mesh.....	4.50
Tyrone, Ky.—Analysis, 90% CaCO ₃ , 4% MgCO ₃ —90% thru 4 mesh.....	1.75@2.25
WESTERN:	
Cement, Calif.—Analysis, 95% CaCO ₃ , 2% MgCO ₃ —50% thru 50 mesh.....	5.00
Colton, Calif.—Analysis, 95% CaCO ₃ , 1 1/2% MgCO ₃ —all to pass 14 mesh; bags 5.00; bulk.....	3.50
Sacks, 15c extra, returnable.....	
Kansas City, Mo., Corrigan Sid'g—50% thru 50 mesh; bulk.....	2.00
Oro Grande, Calif.—Analysis, 94% CaCO ₃ , 2% MgCO ₃ —85% thru 200 mesh; bags, 10.25; bulk.....	4.00
Terminus, Calif.—Analysis, 96.2% CaCO ₃ , .04% MgCO ₃ —60% thru 200 mesh, 90% thru 100 mesh, 95% thru 50 mesh, 100% thru 4 mesh; sacks, 6.00; bulk.....	5.25
Tulsa, Okla.—90% thru 4 mesh.....	.50

Miscellaneous Sands

Silica sand is quoted washed, dried and screened unless otherwise stated.

GLASS SAND	
Beach City, O.—Washed and screened.....	3.00
Berkeley Springs, W. Va.....	2.50
Bridgeton, N. J.—Washed, 2.50; dried.....	3.00
Cedarville and South Vineland, N. J.....	2.25@2.75
Cheshire, Mass.....	5.00@7.00
Columbus, Ohio.....	2.50@3.00
Gray Summit, Mo.....	2.50@4.00
Hancock, Md.—Damp.....	2.00
Klondike and Pacific, Mo.....	2.50@3.00
Leesburg, Pa.—Core, and molding coarse.....	3.00
Mapleton, Pa.—Dry.....	4.00
Glass, damp.....	3.00
Massillon, Ohio.....	3.00
Millington, Ill.....	2.25@3.00
Mineral Ridge, Ohio.....	3.50
Montoursville, Pa.—Green, washed.....	2.00@2.75
Morgantown, W. Va.....	3.00@3.25
Oregon, Ill.—Large contracts.....	2.00@2.75
Ottawa, Ill.....	2.00@2.25
Pittsburgh, Pa.—Dry, 4.00; damp.....	3.00
Robinson, Md.—Washed, damp.....	2.00

(Continued on next page)

Wholesale Prices of Sand and Gravel

Prices given are per ton, F. O. B., at producing plant or nearest shipping point

Washed Sand and Gravel

City or shipping point	Fine Sand, 1/10 inch down	Sand, 1/4 inch and less	Gravel, 1/2 inch and less	Gravel, 1 inch and less	Gravel, 1 1/2 inch and less	Gravel, 2 inch and less
EASTERN:						
Ambridge, South Heights, Pa.	.75	.75	.75	1.00	1.00	1.00
Attica, N. Y.	.48	.48	.48	1.00	1.00	1.00
Erie, Pa.	.90	.90	1.25	1.15	1.15	1.15
Farmingdale, N. J.	.48	.48	2.00	1.75	1.65	1.50
Hartford, Conn.	.75*	.75*	1.70	1.50	1.50*	1.50*
Leeds Junction, Me.	.60@.75	.60@.75	1.30	1.30	.85	.85
Ludlow, Mass.	.75*	.75*	1.70	1.30	1.30	1.35
Pittsburgh, Pa.	.50@.60	.50@.60	1.00	1.50	1.50	1.50
Portland, Maine	.75	.75	2.00	1.40	1.20	1.20
Texas, Md.	.75	.75	2.00	1.40	1.20	1.20
Washington, D. C.	.75	.75	2.00	1.40	1.20	1.20
CENTRAL:						
Alton, Ill.	.85	.85	.85	.85	.85	.85
Anson, Wis.	.50@.60	.50@.60	.90	1.00	1.00	.90@1.00
Attica and Covington, Ind.	.90	.90	.90	1.00	1.00	1.00
Barton, Wis.	.70	.70	.80	.80	.80	.80
Beloit, Wis.	.65	.65	.65	.65	.65	.65
Chicago, Ill.	1.75@2.23	1.75@2.23	1.75@2.43	1.15	1.15	1.15
Cincinnati, O., and vicinity.....	1.20	1.15	.90@1.25	.90@1.25	.90@1.25	.90@1.25
Columbus, O.	.90	.90	1.60	1.60	1.60	1.60
Des Moines, Ia.	1.00	1.00	25% gravel, 1.00; 50% gravel, 1.20	.95	.95	.95
Detroit, Mich.	.65	.65	.65	.65	.65	.65
Earlestead (Flint), Mich.	.70	.70	.70	.70	.70	.70
Eau Claire, Wis.	.40@.50	.40@.50	.60	1.00	1.00	.80
Elgin, Ill.	.80	.80	.80	.80	.80	.80
Elkhart Lake, Wis.	.65	.65	.65	.65	.65	.65
Grand Rapids, Mich.	.60	.60	.60	.60	.60	.60
Greenville, Mechanicsburg, O.	.80	.80	.80	.80	.80	.80
Hawarden, Ia.	.70	.70	.70	.70	.70	.70
Humboldt, Ia.	1.35	1.35	2.20	2.20	2.20	2.20
Indianapolis, Ind.	.60	.60	.60	1.50	.75@1.00	.75@1.00
Janesville, Wis.	.65@.75	.65@.75	.90	1.80	.65@.75	.65@.75
Le Mars, and Doon, Ia.	.90	.90	.90	1.80	1.80	1.80
Lincoln, Neb.	.80	.80	.80	1.30, drained for shipment	1.30	1.30
Mason City, Ia.	.90	.90	.90	1.80	1.70	1.65
Milwaukee, Wis.	1.30	1.30	1.40	1.40	1.40	1.40
Minneapolis, Minn.	.50	.50	1.50	1.50	1.50	1.50
Moline, Ill.	1.00	1.00	1.30	1.30	1.30	1.30
Oxford, Mich.	.50	.50	.50	1.10	1.00	1.10
Riton, Wis.	.85	.85	.85	.85	.85	.85
St. Louis, Mo., f. o. b. cars.....	1.65	1.70	1.85	1.65	1.60	1.60
Summit Grove, Clinton, Ind.	.90	.90	.90	1.00	1.00	1.00
Terre Haute, Ind.	1.00@1.25	1.00	1.25	1.25	.90@1.25	.90@1.25
Winona, Minn.	.80	.70	2.00	1.75	1.50	1.50
Yorkville, Morants, Oregon and Sheridan, Ill.	.90	.90	.90	.90	.90	.85
SOUTHERN:						
Alexandria, La.	.60@.90	.60@.90	.60@.90	.60@.90	.60@.90	.60@.90
Charleston, W. Va.	.85	.85	.85	.85	.85	.85
Dougherty, Okla.	1.00	1.00	1.00	1.00	1.00	1.00
Flomaton, Ala.	2.00@2.25*	2.00@2.25*	2.75@3.00*	2.75@3.00*	2.75@3.00*	2.75@3.00*
Ft. Worth, Tex.	1.10	1.10	1.10	1.10	1.10	1.10
Greenville, Miss.	1.05	1.05	1.05	1.05	1.05	1.05
Jedburg, Mo.	1.15	1.15	1.15	1.15	1.15	1.15
Knoxville, Tenn.	.75	.75	.75	.75	.75	.75
Lake Weir, Fla.	.75@1.00	.75@1.00	.75@1.00	.75@1.00	.75@1.00	.75@1.00
Macon, Ga.	1.40	1.40	1.40	1.40	1.40	1.40
Memphis, Tenn.	1.30	1.30	1.30	1.30	1.30	1.30
N. Martinsville, W. Va.	1.00	1.00	1.00	1.00	1.00	1.00
New Orleans, La.	1.25	1.25	1.25	1.25	1.25	1.25
Pine Bluff, Ark.	.92	.92	.92	.92	.92	.92
Roseland, La.	.70	.70	.70	.70	.70	.70
Tulsa, Okla.	.70@.80	.70@.80	.70@.80	.70@.80	.70@.80	.70@.80
Waco, Texas	.70@.80	.70@.80	.70@.80	.70@.80	.70@.80	.70@.80
WESTERN:						
Grand Rapids, Wyo.	.50	.50	.50	.50	.50	.50
Kansas City, Mo.	1.00	1.00	1.00	1.00	1.00	1.00
Niles, Calif.	1.30	1.30	1.30	1.30	1.30	1.30
Porteau, B. C.	1.20*	1.20*	1.20*	1.20*	1.20*	1.20*
Pueblo, Colo.	2.00	2.00	2.00	2.00	2.00	2.00
Roseburg, Ore.	.80@1.00	.80@1.00	1.30@1.60	1.25@1.55	1.15@1.45	1.10@1.40
San Diego, Calif.	1.00	1.00	1.00	.85@1.00	.85@1.00	.85@1.00
San Francisco, Calif.	1.50*	1.50*	2.00*	1.50*	1.50*	1.50*
Seattle, Wash.	1.50*	1.50*	2.00*	1.50*	1.50*	1.50*

Bank Run Sand and Gravel

City or shipping point	Fine Sand, 1/10 inch down	Sand, 1/4 inch and less	Gravel, 1/2 inch and less	Gravel, 1 inch and less	Gravel, 1 1/2 inch and less	Gravel, 2 inch and less
Albany, Ga.	.70@1.00	.70@1.00	.70@1.00	.70@1.00	.70@1.00	.70@1.00
Attica, Covington, Silverwood, Ind., and Palestine, Ill.	.75	.75	.75	.75	.75	.75
Boonville, N. Y.	.60@.80	.60@.80	.60@.80	.60@.80	.60@.80	.60@.80
Cape Girardeau, Mo.	1.10*	1.10*	1.10*	1.10*	1.10*	1.10*
Cherokee, Ia.	.75	.75	.75	.75	.75	.75
Detroit, Mich.	1.10*	1.10*	1.10*	1.10*	1.10*	1.10*
Dudley, Ky. (Crushed Sand).....	.70	.70	.70	.70	.70	.70
Elkhart Lake, Wis.	.75@.85	.75@.85	.75@.85	.75@.85	.75@.85	.75@.85
Fishers, N. Y.	.70	.70	.70	.70	.70	.70
Ft. Jefferson, Mechanicsb'g, O.	.60	.60	.60	.60	.60	.60
Glenville, N. Y.	1.00*	1.00*	1.00*	1.00*	1.00*	1.00*
Hartford, Conn.	.60	.60	.60	.60	.60	.60
Hersey, Mich.	.65	.65	.65	.65	.65	.65
Janesville, Wis.	.85	.85	.85	.85	.85	.85
Lindsay, Tex.	.75	.75	.75	.75	.75	.75
Oxford, Mich.	.75	.75	.75	.75	.75	.75
Roseland, La.	.75	.75	.75	.75	.75	.75
Saginaw, Mich., f. o. b. cars.....	.65	.65	.65	.65	.65	.65
Summit Grove, Ind.	.80	.80	.80	.80	.80	.80
Valde Rouge, La.	.80	.80	.80	.80	.80	.80
Waco, Texas	.50@.75	.50@.75	.50@.75	.50@.75	.50@.75	.50@.75
Yardville, N. J.	1.00@1.30	1.00@1.30	1.00@1.30	1.00@1.30	1.00@1.30	1.00@1.30
York, Pa.	1.00@1.30	1.00@1.30	1.00@1.30	1.00@1.30	1.00@1.30	1.00@1.30

*Cubic yard. B Bank. L Lake. || Ballast.

City or shipping point	Crushed Slag					
	Roofing	¾ inch down	¾ inch and less	¾ inch and less	1½ inch and less	2½ inch and less
EASTERN:						
Bethlehem and Emaus, Pa.	2.50	.90	1.50	1.20	1.20	1.20
Buffalo, N. Y.	2.35	1.25	1.25	1.25	1.25	1.25
E. Canaan, Conn.	4.00	1.10	2.50	1.35	1.25	1.25
Eastern Pennsylvania and Northern New Jersey						
Erie, Pa.	2.50	1.20	1.50	1.20	1.20	1.20
Emporium, Pa.	2.35	1.25	1.25	1.25	1.25	1.25
Lebanon, Pa.	2.50	.85	1.50	.85	.85	.85
Sharpville and West Middlesex, Pa.	2.00	1.30	1.70	1.30	1.30	1.30
Western Pennsylvania	2.50	.75	1.50	1.20	1.20	1.20
CENTRAL:						
Chicago, Ill.			All sizes, \$1.50, F. O. B. Chicago			
Detroit, Mich.			All sizes, 1.65, F. O. B. Detroit			
Ironton, O.	2.40		other grades 1.75@2.00			
Jackson, O.	2.00	1.35	1.70	1.35	1.35	1.35
Stuebenville, O.	2.00	1.40	1.70	1.40	1.40	1.40
Toledo, O.	2.20	1.70	1.95	1.95	1.70	1.70
Youngstown, Dover, Hubbard, Letonia, Struthers, Steubenville, Lowellville & Canton, O.	2.00	1.30	1.70	1.30	1.30	1.30
SOUTHERN:						
Alabama City, Ala.	2.05	1.00	1.25	1.25	1.00	.95
Ensley, Ala.	2.05	1.00	1.25	1.25	1.00	.95
Longdale, Goshen, Glen Wilton and Low Moor, Va.	2.50	1.00		1.25	1.25	1.15

Agricultural Lime and Hydrate

	—Agricultural Lime—		Per Cent	Per Cent	Agricultural
	Bulk	Bags	CaO	MgO	Hydrate
EASTERN:					
Adams, Mass.		8.00	58.5	0.5	
Bellefonte, Pa.	9.00		98.2	.72	
Berkeley, R. I.			50	18	15.00
Branchton, Pa.		5.50			
Cassadaga, N. Y.—Maritime	8.00	10.00	48.07	1.08	
Cedar Hollow, Devault, Rambo and Swedeland, Pa.	10.50		45.50	30.50	13.00
Chippewa, Pa.	6.00		78.67	1.33	
Highgate Springs, Vt.			85	2	8.00
Hot Springs, N. C.	3.00	4.50			
Hyndman, Pa.	5.00	8.50	80.23	2.87	
Lime Kiln, Md.	8.00				10.75
Lime Ridge, Pa.	6.00@7.50		80.56-62.71	3.87-1.96	
Newburgh, N. Y.			57	38	8.00
Paxtang and Lemoyne, Pa.	5.50		63	3	
Rockland, Maine		8.00	65	1	
Rosendale, N. Y.	8.00	9.00	92	5	
Texas, Md.	11.00	5.50	73	1	13.00
Union Bridge, Md.	6.00	10.00	75	3	10.00
Williamsport, Pa.	4.50	7.50	68	3	
West Rutland, Vt.					
West Stockbridge, Mass.					15.00
Williams and Blue Bell, Pa.		8.25	57	33	11.25
York, Pa.	8.50	11.75	97	2	11.75
CENTRAL:					
Alton and Hannibal, Ill.	11.50			.95	
Delaware, O.			50.0	5-12	10.00
East Sparta, O.			42	62	10.00
Knowles and Valders, Wis.	5.00	9.00	55	45	12.50
Manistique, Mich.	11.00		95	2	11.00
Marblehead, O.			85.10	12.92	12.00
Mitchell, Ind.					12.50
Sheboygan, Wis.	5.50	8.50	58	40.5	
Woodville, Ohio			47.50	31.60	11.50
SOUTHERN:					
Burns, Tenn.	9.50		96	0.54	12.00
Chippewa, Fla.	5.00		80.0	15.0	
Claremont, Va. (Marl.)	5.00	7.00	85-95	2-5	
Dittlinger, Texas		9.00@11.00	98.62	0.29	12.50@15.00
Erin, Tenn.	9.50		97.82	0.12	
Karo, Va.	9.00		97	1.25	
Knoxville, Tenn.	9.00		98.23		13.00
Lushing, Va.	9.00	11.25	60	15	12.75
Staunton, Va.	8.00	10.50	85	10	
WESTERN:					
Colton, Calif.			97	2	15.00
Kirtland, N. Mex.	12.50				
San Francisco, Calif.		15.00	97	0.33	15.00
Tehachapi, Cal.	12.00@15.00	14.00@17.00	98	1.00	
Orofino, Idaho	6.50	8.57	95	2.16	

Miscellaneous Sands

(Continued from preceding page)

Rockwood, Mich.	3.25@3.50
St. Marys, Pa.—Green	2.75
Sands, Elk Co., Pa.—Selected, green	2.75
Thavers, Pa.—Washed	2.00@2.50
Tygarty, Ky.—Washed, not dried	2.60
Utica, Ill.	1.85@2.25
FOUNDRY SAND:	
Ableman, Wis.—Brass molding and molding fine	3.00
Alhany, N. Y.—Glass and sand blast	2.00@7.00
Core	1.40@2.50
Furnace lining	2.50@3.00
Molding fine, coarse and brass	2.50@3.50
Allentown, Pa.—Core	1.50@1.75
Molding coarse	1.50@1.75
Arenzville, Ill.—Molding fine	1.70@1.90
Beach City, O.—Core, washed and screened	2.00@2.50
Furnace lining	2.50@3.00
Molding fine and coarse	2.25@2.50
Bowmantown, Pa.—Core	1.35@1.50

Molding, coarse	1.80@2.00
Cleveland, O.—Molding coarse	1.50@2.00
Brass molding	1.50@2.00
Molding fine	1.50@2.00
Core	1.25@1.50
Columbus, O.—Core	.60@2.50
Brass molding	2.50
Sand blast	5.00@5.50
Glass sand	3.00
Molding, fine and coarse	2.00@2.25
Conneaut, O.—Molding fine	2.25@2.50
Molding coarse	2.00@2.25
Delaware, N. J.—Molding fine	2.00
Brass Molding	1.90
Dresden, O.—Core	1.50
Molding fine and coarse	1.50@1.75
Brass molding	2.50
Dunbar, Pa.—Glass sand No. 2, damp	3.00
Traction, damp	3.25
Dundee and Chalfants, O.—Core	3.00
Glass, sand blast and traction	3.00
Molding fine, brass molding	3.75
Molding coarse	3.25
Furnace lining	2.75

Miscellaneous Sands

(Continued)

Eau Claire, Wis.—Core	1.00
Roofing gravel	1.00@1.25
Sand blast	3.00@4.25
Traction sand	.50
Falls Creek, Pa.—Glass sand, washed	2.50
Core sand, washed or unwashed	2.00
Furnace lining, unwashed	2.00
Molding fine, washed	2.50
Molding coarse, washed or unwashed	2.00
Sand blast, washed	3.50
Stone sawing, washed	2.50
Traction, washed	2.00
Fleetwood, Pa.—Furnace lining	2.25
Franklin, Pa. and Utica, Pa.—Traction	2.50
Brass molding	2.25
Core	1.50@2.50
Molding fine	2.25
Molding coarse	2.50
Sand blast	5.00
Greenville, Ill.—Molding coarse	1.80@2.00
Hellam, Pa.—Core	2.00@2.50
Joplin, Mo.—Stone sawing, flint	1.00@1.25
Kansas City, Mo.—Missouri River core	.80
Kasota, Minn.—Molding coarse and stone sawing	1.75
Klondike and Gray Summit, Mo.—Molding fine	2.00@2.50
Molding coarse	2.50@3.00
Mapleton, Pa.—Core, furnace lining, molding fine and coarse damp	2.50
Core, furnace lining, molding, fine and coarse, dry	3.50
Massillon, O.—Glass sand, molding fine and coarse, core, traction and furnace lining	3.00
Michigan City, Ind.—Core, glass, traction and brass molding	.60
Millington, Ill.—Glass, core, furnace lining, roofing and stone sawing	1.75
Mineral Ridge, O.—Core, molding, sand blast, roofing, etc., washed, screened (damp)	2.75
Montoursville, Pa.—Core and traction	1.50@2.00
Brass molding	1.75@2.25
New Lexington, O.—Molding fine	3.50
Molding coarse	1.25
Oregon, Ill.—Core sand	2.25@3.00
Furnace lining	2.00@2.75
Molding fine, coarse and brass	1.00@1.65
Plasters' molding	2.50
Sand blast	2.25@4.00
Placing sand	3.50
Ottawa, Ill.—Crude silica sand	1.25@1.50
Core, molding, fine and coarse	1.10@2.25
Furnace lining	1.25@2.25
Roofing	2.00@5.00
Sand blast	4.00@5.00
Ottawa, Minn.—Core	2.00@2.50
Glass, molding coarse, roofing, stone sawing (all crude silica)	2.00@2.50
Ridgeway, Pa.—Glass sand, green	2.25
Glass sand, wash	2.50
Molding, fine and coarse	1.20
Rockwood, Mich.—Core	3.00
Roofing, stone sawing	3.50
Sand blast	4.00
Round Top, Md.—Glass sand, core and roofing sand; washed, damp	2.50
San Francisco, Cal.—Glass and roofing	3.00@3.50
Core, molding fine and brass	2.30@2.50
Furnace lining and molding coarse	3.60@4.50
Thayer, Pa.—Traction	1.75@2.00
Furnace lining	1.10
Molding fine and coarse	1.25
Core, green	1.75@2.00
Tulsa, Okla.—Sand blast	6.50
Tygarty, Ky.—Core and stone sawing	2.15@2.40
Fire-brick sand, washed but not dried	1.25@1.50
Utica, Ill.—Core and furnace lining	1.25@1.35
Molding, fine and coarse	1.00@1.35
Stone sawing and roofing	1.25@2.25
Sand blast	3.50
Warwick, Ohio—Core, furnace lining, molding fine and coarse (dry)	2.75
Same, green	2.50
Wedron, Ill.—Core (crude silica)	1.10@1.25
Molding fine	1.10@1.25
Furnace lining	1.25
West Albany, N. Y.—Molding fine	2.25
Molding coarse	2.25
Winnipeg, Man., Can.—Roofing sand	4.00
Zanesville, Ohio—Molding fine and brass	2.00@2.25
Molding coarse	1.75@2.00
Furnace lining	2.75
Steel molding	8.50
Pulverized silica thru 140 mesh	9.50
Thru 200 mesh	

Crushed Gypsum

Blue Rapids, Kan.	3.50
Castalia, O.	3.00
Fr. Dodge, Ia.	3.50@4.50
Grand Rapids, Mich.	4.50
Gypsumville, Man., Can.	3.50
Oakfield, N. Y.	4.00
Gypsum, O.	3.50
Port Clinton, O.	3.50
Saltville, Va.	4.50
Winnipeg, Man., Can.	5.00

(Gypsum) Land Plaster

Castalia, O.	6.00
Bags extra—Jute 3.00; ppr., 1.00.	
Garhutt, N. Y.—Bags extra	7.50
Grand Rapids, Mich.	7.50
Mound House, Nev.	7.00@8.00
Sacks, 25 extra.	
Oakfield, N. Y.	7.50
Sandusky, O.	6.00
Jute, 3.00 extra; ppr., 1.00 extra.	
Los Angeles, Calif.	12.50

Rock Phosphate**Raw Rock**

Centerville, Tenn.—B.P.L. 72% to 75%	6.00@8.50
B.P.L. 65%	8.00
B.P.L. 70%	9.00@10.00
Gordonsburg, Tenn.—B.P.L. 68%	6.00@7.00
B.P.L. 72%	7.50@8.00
B.P.L. 72%	8.50@9.00
Paris, Idaho—2,000 lb. mine run,	
B.P.L. 70%	4.50
Wales, Tenn.—B.P.L. 70%	8.00

Ground Rock

Centerville, Tenn.—B.P.L. 70%—	
90% thru 100 mesh	9.00@10.00
B.P.L. 75% (brown rock)	12.00
Mt Pleasant, Tenn.—B.P.L. 68%—	
13% Phosphorus	7.50@9.00
14% Phosphorus	8.00
B.P.L. 65@70%	6.50@8.50
Norwills, Fla.—(Fla. Hard Rock)—	
B.P.L. 68%	10.00

Florida Soft Phosphate**Raw Land Pebble**

Per Ton	
Bartow and Norwills, Fla.—B.P.L. 60% ;	
bulk	10.00
Jacksonville (Fla.) District	10.00@12.00

Ground Land Pebble

Per Ton	
Croon, Fla.—Ground, 30% phos. acid	16.00
Pulverized soft, 26% phos. acid	17.50
Jacksonville (Fla.) District	14.00
Add 2.50 for sacks.	
Phoslime, Fla.—In burlap bags	15.00
Morristown, Fla.—24% phos. acid	17.50@20.00
Lakeland, Fla.—B.P.L. 72%	13.50
B.P.L. 60%	6.00

Portland Cement

Current warehouse prices, carload lots at principal cities, without bags:

New York (del.)	\$3.10
Jersey City (del.)	2.89
Boston	2.87
Chicago	2.17
Pittsburgh	2.17
Cleveland	2.43
Detroit	2.51
Indianapolis	2.31
Toledo	2.51
Milwaukee	2.39
Duluth	2.10
Peoria	2.43
Cedar Rapids	2.51
Davenport	2.47
St. Louis	3.40
San Francisco	3.09
New Orleans	3.60
Minneapolis (del.)	2.60
Denver	3.10
Kansas City	2.76
Lincoln, Neb.	3.05
Seattle	3.10
Dallas	2.85
Atlanta	3.05
Cincinnati	3.32
Los Angeles	3.21
Baltimore (del.)	2.93
Montreal (including bags)	4.28

NOTE—Bag charge is generally 25c each.

Concrete Brick

Prices given per 1,000 brick, f.o.b. plant or nearest shipping point.

	Common	Face
Bellow Falls, Vt.	25.00	35.00
Bridgeport, Conn.	31.00	32.00
Buffalo, Niagara Falls		
and Rochester, N. Y.	21.00	30.00@45.00
Eau Claire, Wis.	22.00	27.00
Houston, Tex.	17.00	
Lockport, N. Y.	18.00	40.00@65.00
Milwaukee, Wis.	32.00	42.00
Omaha, Neb.	20.00	25.00@30.00
Piqua, O.	28.00	48.00@75.00
Portland, Ore.	100.00@150.00	
Fancy brick	18.00	30.00@35.00
St. Paul, Minn.	18.00	20.00@25.00
Springfield, Ill.		

Roofing Slate

The following prices are per square (100 sq. ft.) for Pennsylvania Blue-Gray Roofing Slate, f.o.b. cars quarries:

Sizes	Genuine Bangor, Washington Big Bed, Franklin	Genuine Albion	Slatington Small Bed	Genuine Bangor Ribbon
24x12	\$ 9.30	\$8.40	\$8.10	\$8.10
24x14	10.72	8.70	8.10	8.10
22x12	10.72	8.70	8.77	9.10
22x11	10.72	8.70	8.77	9.10
20x12	11.70	9.60	9.42	9.42
20x10	11.70	9.60	9.42	9.42
18x10	11.70	9.60	9.42	9.42
18x 9	11.70	9.60	9.42	9.42
16x 9	11.70	9.60	9.42	9.42
16x 8	11.70	9.60	9.42	9.42
18x12	11.05	9.30	9.10	9.10
16x12	11.05	9.30	9.10	9.10
14x10	11.05	9.30	8.77	8.77
14x 8	11.05	9.30	8.77	8.77
14x7 to 12x6	10.40	9.00	8.45	8.77
24x12	Mediums	Mediums	Mediums	Mediums
22x11	\$ 8.10	\$7.50	\$7.50	\$5.75
Other sizes	9.10	7.75	7.75	5.75
For less than carload lots of 20 squares or under, 10% additional charge will be made.	8.10	8.10	8.45	5.75

The following are the prices per square for slate, f.o.b. cars quarries, Granville, N. Y., the prices given in each case being for No. 1 Sea Green Roofing Slate:

22x11, 20x12, 20x11, 20x10, 18x12, 18x10,	
18x9, 16x12, 16x10	10.20
24x12, 22x12, 16x9, 16x8, 14x12, 14x10	9.90
26x14, 24x14, 22x14, 20x14	9.60
14x9, 14x8, 12x10	9.00
14x7, 12x9, 12x8	8.70
12x7, 11x8, 11x7, 10x8	7.50
12x6, 10x7	7.20

Granulated slate per net ton, f. o. b. quarries, Vermont and New York, 7.50.

Lime

Warehouse prices, carload lots at principal cities.

	Hydrate per Ton
	Finished Common
New York	\$21.00
Kansas City	\$20.00
Chicago	20.00
St. Louis	26.00
Boston	29.00
Dallas	25.00
Cincinnati	19.50
San Francisco	25.40
Minneapolis	27.00 (white)
Denver (bbl.)	22.00
Detroit	3.20
Seattle	27.00
Los Angeles	30.00
Baltimore	24.00 (East)
Montreal	28.00
Atlanta	18.00
New Orleans	22.50

	Lump per 200-lb. Barrel
	Finished Common
New York	\$ 3.50 at plant \$ 3.30*
Kansas City	2.50
Chicago	1.75
St. Louis	4.12½*
Boston	3.80
Dallas	2.50†
Cincinnati	2.10
San Francisco	2.25
Minneapolis	2.00
Denver	1.00 (bu.)
Detroit	2.00†
Seattle	2.25†
Los Angeles	3.00*
Baltimore	1.75
Montreal	15.00†
Atlanta	1.80†
New Orleans	2.70

* 300-lb. barrels. † Per 180-lb. barrel. ‡ Per ton. NOTE—Refund of 10c per barrel with 25c per ton off on hydrated.

Talc

Prices given are per ton f. o. b. (in carload lots only) producing plant, or nearest shipping point.

Baltimore, Md.—Crude talc	4.00
Cubes	50.00
Blanks, per lb.	.07
Biltmore, N. C.—Ground talc (150-200 mesh), 200-lb. bags	15.00@30.00
Pencils and steel workers' crayons, per gross, 1.25@1.45 and	1.55@ 1.60
School crayons, per gross	1.15@ 1.20
Roller mill crayons, per gross	1.75@ 1.90
Chatsworth, Ga.—Crude talc	8.00@10.00
Ground talc (150-200 mesh), bags	12.50
Pencils and steel workers' crayons, per gross	1.50@ 2.00

Chester, Vt.—Ground talc (150-200 mesh), bulk, 10.50@12.00; bags, 12.00@14.00
Emeryville, N. Y.—Crude Talc..... 4.00
Glendale, Calif.—Ground talc (150-200-mesh)..... 16.00@30.00

(Bags extra)
Gouverneur, N. Y.—Crude talc..... 4.00
Ground talc (150-300 mesh)..... 17.00@24.00
Henry, Va.—Crude talc (lump mine run), per 2000-lb. ton..... 3.00@ 3.25
Ground talc (20-50 mesh), bags..... 8.50@ 9.00
Ground talc (150-200 mesh), bags..... 11.00@13.50
Johnson, Vt.—Ground talc (20-50 mesh), bulk..... 8.50

(Bags extra)
Ground talc (150-200 mesh), bulk..... 10.00@20.00
Keeler, Calif.—Ground talc (200-300 mesh), bags..... 18.75@32.00

(Bags extra)
Los Angeles, Calif.—Ground talc (20-50 mesh) 200-lb. bags..... 12.00
Ground talc (150-200 mesh) 200-lb. bags..... 20.00

Natural Bridge, N. Y.—Ground talc (150-200 mesh) bags..... 12.00@18.00
Rochester and East Granville, Vt.—Ground talc (20-50 mesh), bulk..... 8.50@10.00

(Bags extra)
Ground talc (150-200 mesh), bulk..... 10.00@22.00
Waterbury, Vt.—Ground talc (20-50 mesh), bulk..... 8.50

(Bags extra)
Ground talc (150-200 mesh), bulk, 10@15.00 and..... 10.00@15.00

(Bags extra)
Pencils and steel workers' crayons, per gross..... 1.20@ 2.00

Sand-Lime Brick

Prices given per 1,000 brick f. o. b. plant or nearest shipping point, unless otherwise noted.

Albany, Ga.	13.00@14.00
Barton, Wis.	14.00
Bloomfield, Ont., Can.	18.00
Boise, Idaho (in yard)	18.00
Boston, Mass.	18.00@19.00
Brighton, N. Y.	19.00
Buffalo, N. Y.	16.50
El Paso, Texas	15.00
Gary, Ind.	11.50@12.00
Grand Rapids, Mich.	15.00
Lancaster, N. Y.	16.50
Michigan, Wis. (delivered at job)	17.50
Milwaukee, Wis.	17.00
Plant City, Fla.	20.00@25.00
Portage, Wis.—Common	35.00
Face	13.00
Rochester, Mich.	17.00
Saginaw, Mich.	20.00
San Antonio, Texas—Common	27.50
Face	16.50
South Dayton, Ohio	25.00
Syracuse, N. Y. (delivered at job)	21.00
F. o. b. cars, plant	17.00
Toronto, Can.	14.50
Washington, D. C.	19.00
Winnipeg, Can. (less \$1 trade disc.)	

Natural Cement

Current price for 500 bbl. or over, f.o.b., exclusive of bags:

Minneapolis (Rosendale)	\$2.80
Kansas City (Ft. Scott)	1.60
New Orleans	3.36
Atlanta (Magnolia)—ton	11.00
Boston (Rosendale)	2.35
Cincinnati (Louisville)	2.75



News of the Industry



Incorporations

The Pre-Cast Concrete Co., Wilmington, N. J., has been incorporated for \$300,000.

The Reinforced Concrete Silo Co. has been organized in Chehalis, Wash., to make silos under the Orme patent.

The Miller-Druck Co., Union, N. J., has been incorporated for \$100,000 to deal in sand, gravel, stone, cement, etc.

The Dal Tex Gravel Co., Dallas, Texas, has been incorporated for \$50,000 by G. S. Webber, W. G. Jenkins and P. C. Miller.

The Midwest Mica Co., Kansas City, Mo., has been incorporated in La Madera, New Mexico, for \$60,000 to mine and market mica.

The Tishomingo Sand and Gravel Co., Enid, Okla., has been incorporated for \$20,000 by L. A. Snyder, C. L. Brown and P. E. Slater.

The Friday Harbor Brick & Tile Co. has been incorporated in Friday Harbor, Wash., to manufacture and sell cement and clay products.

The Oak Grove Lime Co., Fresno, O., has been incorporated for \$3,000 by Daniel Gribble, S. E. Boyd, B. O. Stingel and George Stonehacker.

The A. C. Flint Gravel Co., Cowley Co., Kan., has been incorporated for \$100,000 by J. W. Chestnut and W. G. Orr, both of Trenton, Ky.

The Moss-DeVoy Lime and Stone Co., Memphis, Tenn., has been incorporated for \$50,000 by L. J. Moss, president, and Clarence DeVoy, vice-president.

The Mines Development Co., Silver Lake, N. Mex., has been incorporated for \$50,000 by C. W. Mitchell, T. C. McSherry and C. C. Royall.

The Eldon Gravel Co., Muskogee, Texas, has been incorporated for \$25,000 by H. B. Nelson, G. M. Swanson and Irwin Donovan, all of Muskogee.

The M. Sanderson, Co., Milwaukee, Wis., has been incorporated for \$40,000 by C. J. Sanderson, C. N. Sanderson and H. T. Sanderson to deal in all building materials.

The Nelson Concrete Culvert Co. has been incorporated in Hattiesburg, Miss., with a capital of \$100,000, by R. J. Orr, B. R. Thompson and W. J. Butler, all of Pontiac, Ill.

The River Gravel and Sand Co., Mankato, Minn., has been incorporated for \$50,000 by J. G. Emery, president; G. H. Morrow, vice-president; F. E. Caldwell, secretary, and Emil Schoyen, treasurer.

The Marion Blue Limestone Co., Marion, O., has been incorporated for \$25,000 by W. J. Glenn, E. G. Holzhauser, H. A. Stevens and Charles Glenn. Mr. Holzhauser is the manager of the company.

The Non-Burnable Building Products Co., Yonkers, N. Y., has been incorporated for \$100,000 by H. A. George, W. M. G. Watson, J. H. Claffy, E. S. Oldis and J. C. Krunwiede, all of New York City.

The Sunlight Stone Quarry Co. has been incorporated in Madisonville, Ky., with a capital of \$100,000, by J. Basil Ramsey, Madisonville; W. J. Sparks, Mt. Vernon, Ky., and Robert J. McBride, Louisville, Ky.

The National Crushed Stone Co., Minneapolis, Minn., has been incorporated for \$200,000 by H. P. Webb, president; A. S. Larsen, vice-president, and W. M. Pratt, secretary and treasurer, all of Sandstone, Minn.

The Universal Concrete Products Co., New Martinsville, W. Virginia, has been incorporated for \$30,000 by Hector and Sicely Eschenbrenner, H. T. Leuliette, G. M. West and George Malfreget, all of Clarksburg.

The La Grande Concrete Pipe Co., has been incorporated in La Grande, Ore., with a capital stock of \$20,000, by Christian Spies, C. H. Bullen and Phil Easterday. The company will make concrete pipe, tubing and culverts.

The Signal Mountain Portland Cement Co. has been incorporated in Atlanta, Ga., with a capital stock of \$3,000,000, with the following officers: R. C. Lubens, president, St. Angar, Ia.; Ralph A. Law, secretary, Mason City, Ia.

The Brown Engineering Co., Minneapolis, Minn., has been incorporated for \$50,000 by S. W. Brown, president; H. B. Christian, vice-president; M. A. Bancroft, secretary and R. H. Bancroft, treasurer. The company will engage in manufacturing and engineering.

Cement

The Old Mission Cement Co., San Juan, Calif., has completed 1200 ft. of new tramway to two new quarries which are to be opened at once.

The Black Hills Rock Products Co., Rapid City, S. D., has decided to start reconstruction work on its cement plant two miles west of that city.

The Colorado Portland Cement Co., Denver, Colo., report that the cement business in that section of the country is slowly but surely getting better.

The New York and New England Cement and Lime Co., Hudson, N. Y., has resumed full operations. The plant has been undergoing repairs and a general overhauling.

The Rosslyn Steel & Cement Co., Woodward Building, Washington, D. C., awarded a contract to the Spencer Construction Co., Garrett Building, Baltimore, Md., for the erection of its proposed new building at Jefferson and K Streets, two-story, concrete, estimated to cost about \$35,000.

Quarries

The Pounding Mill Crusher Co., Graham, N. Y., has resumed operations after being closed down for several months.

Lowville, N. Y., has voted to purchase a stone quarry where they will quarry and crush stone for city work.

The Lackawanna limestone quarry at Pekin, N. Y., has resumed operations with a force of about 125. Laborers' wages have been cut from 44 cents an hour to 32 cents.

The Adams and Duford Co., Watertown, N. Y., is constructing an addition to its quarry, 40x60 ft., to cost about \$15,000. The new addition will house three bins and a pulverizer for limestone.

The State Crushed Granite Co., Watab, Minn., has leased its crushing plant here to the McGee-Moos Co. The plant is one of the largest in the northwest and two new crushers are being installed.

The Elaborated Ready Roofing Co., Chicago, Ill., has purchased the O. P. Nason mill and equipment near the Pipestone, Minn., quarries. The company will pulverize the red rock quarried in this district and will use it for roofing purposes.

The Hastings Stone Co., Hastings, Minn., has purchased the crushing plant of the Minneapolis Stone Co. and will move the same to the Hastings plant. J. M. Hazen, manager of the Minneapolis Stone Co., will become manager of the plant at Hastings.

The State Legislature of Pennsylvania, is considering a bill, introduced by Senator Christie, placing all stone, slate, marble and granite quarries under the jurisdiction of the Department of Mines. Clay properties, ore and graphite lands are also included in the measure.

The Texas Stone Products Co., Dallas, Texas, was awarded a contract recently for 100,000 tons of crushed rock at \$1.10 per ton with an option on an additional 100,000 tons at the same price. The rock is to be used on road work in the county and the above bid was f.o.b. cars near Chico, Texas.

The Collins Granite Co., Danville, Va., has recently completed the erection of a stone crushing plant with a capacity of about 1000 tons per day. The property consists of 23 acres of granite which will be quarried by steam shovel. About \$100,000 has been spent in developing the property up to the present time.

The Star Lime and Zinc Co., St. Joe, Ark., has been purchased by the Moss-DeVoy Lime and Stone Co., a new firm recently organized. The new company plans to double the capacity of the St. Joe plant which manufactures lime, crushed stone and agricultural limestone. The offices of the new company are located at 82 So. Front St., Memphis, Tenn.

The Buckeye Stone Co., 425 Slaughter Building, Dallas, Tex., is planning for the immediate construction of a new rock-crushing plant on property under development in that section. The company's holdings total about 150 acres, and the new plant will have a capacity of approximately 3,000 tons of material per day. The company was recently organized with a capital of \$150,000. W. V. Cullen is president.

Sand and Gravel

The Cazenovia Sand & Gravel Corp., Elmira, N. Y., has filed notice of dissolution under state laws.

A new gravel pit is being opened north of Bellevue, Iowa, containing about 160 acres. The gravel is about 44 ft. thick with about 15 ft. of sand on top.

The Pioneer Sand & Gravel Co., Seattle, Wash., has added a new \$15,000 scow to its equipment. The scow was recently launched and is 130 ft. long by 38 ft. wide and 11½ ft. deep, and is to be used for gravel.

The Colonial Sand & Stone Co., Inc., 643 West Fifth Street, New York, is operating its own sand properties at Glenwood, L. I. The plant is located on the Hempstead Harbor, in the well-known "Cow Bay" sand district.

H. W. Campbell, Gaffney, S. C., has inaugurated preliminary development work on a large tract of monazite sand property in this section, totaling about 300 acres. It is planned to install two new magnetic separators and general operating equipment.

W. E. Pomeroy, of Beaver Dam, Wis., has secured an option on a valuable sand and gravel deposit in that vicinity and a new corporation is in process of organization to develop the property. The stock is to be sold among building supply dealers throughout the state who handle these materials. The Central Wisconsin Supply Co., of Beaver Dam, is expected to act as a sales organization for marketing the products. Thirty acres with deposits 100 feet deep are said to have been secured under the option, and the great highway construction program in Wisconsin during the next few years will furnish an excellent demand.

Concrete Products

Mr. Linn is constructing a building in Walla Walla, Wash., and will engage in the manufacture of concrete building blocks.

G. W. Tidd, Selma, Ala., is considering the establishment of a \$25,000 plant in Tuscaloosa, Ala., for the manufacture of cement brick and other products.

The F. X. Farrell Co., contractors, Hibbing, Minn., will soon begin the manufacture of concrete blocks in that city, in a new factory employing sixteen men.

The Shope Brick Co., Portland, Ore., is planning the establishment of a cement brick plant in San Antonio, Texas. E. A. Ewing of San Antonio is their representative.

The American Progressive Sales Co., of which S. F. Roberts, Asheville, N. C., is manager, will erect a factory in Charlotte, N. C., for the manufacture of concrete building units.

John B. Fellrath Co., Fond du Lac, Wis., is erecting a new building for the manufacture of concrete blocks and brick. The new building is 100 ft. by 100 ft. and one story in height.

The Winamac Cement Product & Construction Co., Winamac, Ind., has acquired a local cement tile plant, and will operate the works for tile and other production. The new company is headed by Christopher Hanson and George Kenzick.

The Spokane Concrete Pipe Co., Helena, Mont., has started work on a building 60x100 ft. which will be used as a plant for manufacturing concrete products. The company has a contract to furnish concrete pipe for the Rimini water line to be constructed at Helena.

The Dexter-Geare Corporation, Miami, Fla., has acquired a local site for the construction of a new plant for the manufacture of concrete wall tile, bricks, roofing tile and kindred products of monolithic type. The company will also build a new one-story machine shop.

Manufacturers

The Washington County Commissioners, Bartlesville, Okla., of which J. L. Lott is chairman, are in the market for a complete rock crushing plant with a capacity of 100 tons per day.

The Ellengowen Lime Co., Cockeysville, Md., is in the market for a complete lime hydrating plant with a capacity of 3 to 4 tons per hour.



USED EQUIPMENT



Rates for advertising in the Used Equipment Department: \$2.50 per column inch per insertion. Minimum charge, \$2.50. please send check with your order. These ads must be paid in advance of insertion.

Repaired Contractors' Equipment

Steam Shovels

Model 60 Marion Shovels, 2½-yard dippers, Nos. 1999, 2059, 2130

1—Model 1 Thew, on railroad trucks, ⅞-yard dipper.

1—Bucyrus Model 70-C, Shop No. 1219.

We have a large stock of thoroughly repaired Construction Equipment of all kinds ready for immediate shipment.

Locomotives

8—18-ton, 10x16" Porter Dinkeys, 36" gauge.

2—12-ton, 9x14" Porter Dinkeys, 36" gauge.

1—17x24", 55-ton, 4-6-0, standard gauge.

3—25-ton Forney type.

Clam Shell Buckets

1—1¼-yard Williams Hercules Bucket.

Cars

30—Western Air Dump 12-yard, standard gauge.

40—Western 4-yard, 36" gauge, steel beam.

H. KLEINHANS COMPANY

Union Arcade

Pittsburgh, Pa.

Machinery For Sale

DRYERS—Direct-heat rotary dryers, 3x25', 3½x25', 4x30', 5½x50', 6x50' and 7x60'; double shell dryers, 4x20', 5x30' and 6x35'; steam-heated air rotary dryers, 4x30' and 6x30'.

KILNS—Rotary kilns, 3½x25', 5x60' and 6x70', 6x100', 7x80' and 8x110'.

MILLS—6x8', 6x5', 2½x3' 3x3½' pebble and ball mills; 8x4', 6x4' and 4x4' continuous ball mills; 3' March mill; 42", 33" and 24" Fuller-Lehigh mills; 4½x20', 5x11', 5x20', 5½x22' and 6x20' tube mills; 7½x13", 9x15", 16x10" and 30x60" jaw crushers; one "Infant" No. 00, No. 0, No. 2, No. 3, and No. 9 Williams' swing hammer mills; one Kent type "G" mill; 36" and 40" cage mills; 3' and 4½' Hardinge mills; 18x12", 20x12" and 30x10" roll crushers; No. 0, No. 1 and No. 3 Sturtevant rotary crushers; one No. 2 Sturtevant ring roll crusher; 3 roll and No. 000, No. 00 and No. 0 Raymond mills; one No. 5 Tel-smith breaker; one 36" Sturtevant emery mill; one 3 roll Griffin mill; 60" chaser mill.

SPECIALS—Five automatic package weighing machines; jigs; one keystone excavator; 6x8', 6x5' and 4x3' Newaygo vibrating screens, Richardson automatic scales.

Air compressors and tanks.

W. P. Heineken, Engineer

95 Liberty Street, New York. Tel. Cortland 1841

AUSTIN GYRATORY CRUSHERS

- 2—No. 2, Standard Drive
- 1—No. 3, Standard Drive
- 1—No. 5, Standard Drive
- 1—No. 5, Angle Drive
- 1—No. 6, Standard Drive
- 1—No. 7½, Standard Drive

These are a few specials that we wish to move quickly. We also have Crushers of other makes and sizes, also Jaw Crushers, Elevators, Screens, Conveyors, Cranes, Locomotives, Cars, Rail, Hoists and other machinery such as you use. Write us fully, and if you have excess plant, also mention what it is.

Reading Engineering Co., Inc.

1227 Tribune Bldg.

New York, N. Y.

Locomotives for Rent or Sale

- 2—50-ton 18x24 in. air-wheel switchers.
- 1—40-ton 17x24 in. four-wheel switcher.
- 1—40-ton Vulcan four-driver saddle-tank.
- 2—18-ton and 14-ton 36-in. gauge Vulcans.
- 2—10-ton 7x12 in. 36-in. gauge Vulcans.
- 1—10-ton 36-in. gauge Shay geared.

Miscellaneous

- 1—Marion 35 steam shovel on traction wheels.
- 1—Marion 76 steam shovel, No. 3503.
- 1—Lidgerwood dragline, 60-ft. boom, 2-yd. bucket.
- 100—60,000-lb. capacity box cars, 40-ft. long.
- 40—60,000-lb. capacity flat cars, 36-ft. long.
- 13—6-yd. dump cars, 4-ft. 8½-in. gauge.
- 12—1½-yd. "V" steel dump cars, 36-in. gauge.
- 1—Western standard gauge spreader.
- 2-in., 4-in., and 6-in. simple, duplex, and centrifugal pumps, 10 H.P. and 45 H.P. upright boilers, tripod drills, etc.

LOCOMOTIVE CRANES, RAILWAY EQUIPMENT, etc.

INDUSTRIAL EQUIPMENT CO.
McCormick Building, Chicago, Ill.

FOR SALE

One second hand No. 5 Good Roads Crusher, with opening 11"x26", in excellent condition; a real bargain to a quick buyer. Address

Box 1453

Care of Rock Products



Rates for advertising in the Used Equipment Department: \$2.50 per column inch per insertion. Minimum charge, \$2.50. Please send check with your order. These ads must be paid in advance of insertion.

"Everything for the Quarry"

- 1— $\frac{3}{4}$ -yd. Thew "O" Traction Shovel.
- 1—8-ton Davenport Type "D" Caterpillar Crane.
- 1—3-ton Std. Ga. Plymouth Gasoline Locomotive.
- 1—7x12 cyl. 36-in. gauge Porter Saddle Tank.
- 1—9x14 cyl. 36-in. gauge Vulcan Saddle Tank.
- 1—10x16 cyl. 36-in. gauge Davenport Saddle Tank.
- 1—11x16 cyl. 36-in. gauge American Saddle Tank.
- 20—36-in. gauge 4-yd. Western Dump Cars.
- 3—16-yd. Western Air Dump Cars.
- 5—60,000-lb. Cap. Side Dump Ballast Cars.
- RAILS—Track Material—Hoists—Boilers—Derricks—Pipe.

ZELNICKER IN ST. LOUIS

Big Bulletin 290—Just Out—Get YOUR Copy Now.

Equipment for Sale

Sauerman Dragline Excavator Outfit Complete, Including

- 1—100-ft. Lattice Steel Tower.
 - 1— $\frac{1}{2}$ -yd. Bucket and Carrier, with extra new bottom; never been used.
 - 900 ft. $\frac{1}{4}$ Track Cable, good condition.
 - 850 ft. $\frac{3}{4}$ Hauling Cable in good condition.
 - 1—Thomas Elevator Co. Double Drum Two Speed Hoisting Engine.
 - 1—100-H.P. Alternating Current Motor.
- All in good working condition. Hoisting Engine practically good as new. Located in Erie, Pennsylvania. Also one Besser Concrete Block Machine. For particulars, address

DOWNING GRAVEL PIT

1117 State Street Erie, Pennsylvania

We offer for Immediate Delivery, subject to prior sale, F. O. B. cars Attica, N. Y.

- 1—10 ton, 4 wheel Browning Crane No. 1499. 42 ft. boom. Crane in good condition. Price \$4800.00.
- 1—3 ton Plymouth Gasoline Locomotive, 36 in. gauge, good condition. Price \$1400.00.
- 1—25 hp. Semi-diesel, type Y, special Electric, Fairbanks-Morse Fuel Oil Engine, complete with new firing chamber, used three months, good as new. Price \$600.00.
- 1—50 hp. Rice Automatic Steam Engine, cylinder 9x16, good working condition. Price \$300.00.
- 1—Fuel Oil steel cylinder tank, 24 in. x 10 ft. Capacity 235 gallons. Price \$50.00.

J. E. CARROLL SAND CO.
White Building, Buffalo

FOR SALE

- 9x16" Climax Jaw Crusher mounted on I-beams and trucks.
- No. 2 Style D. Gates Gyratory Crusher.
- 75 H.P. 13" bore by 16" stroke, side crank Erie City Steam Engine.
- 125 H.P. 18" bore by 24" stroke, side crank Atlas Steam Engine. Shop No. 25197.
- 12x12" Lidgerwood Standard, double cylinder, 2 drum cableway engine.
- 600 lineal feet $\frac{1}{4}$ " Roebling Wire Cable—never used.
- 100—H.P. Motor; 100 K.W. Generator, 60 cycles, 550 volts, maker Fairbanks & Morse. Both new. Address.

E. W. Cooper, Engineer
2010 Locke Ave. Nashville, Tennessee

IMMEDIATE DELIVERY

18—8 and 9 K Crushers, Reg. Drive

- 2—18 in. and 24 in. Disc Crushers.
 - 2—150 hp., 125 lb. Marine type boilers.
 - 2—150 hp., 125 lb. H.R.T. boilers, buttstrap.
 - 4—No. 6 Gates (Mang. Fit.) nickel steel shafts.
 - 1—No. 7 $\frac{1}{2}$ and 1—No. 8 Gates reg. drive.
 - No. 2, 3 and 4 Gates reg. drive.
 - Air Compressors (steam-belt), 60 to 4000 ft.
 - 40 boilers, 60-150 hp., 100-130 lbs.
 - 1—100 hp. Ver. Boiler.
 - 4—NEW No. 4 Gates Mang. Fit. \$1650 each.
 - 1—No. 16 Koehring Paver, $\frac{1}{2}$ yd. steam.
 - 1—8 x 8 and 10 x 10 Air Comp. (belt).
 - 2—180 ft. Quick Shift 30 ft. bucket towers.
 - 2—156 kw., 240 V., 60 Cy., 3 Ph. Eng. Sets.
 - 50 kw., 125 V., Dir. Cur. Eng. Set, \$750.
 - 5, 10 and 15 ton HOLT TRACTORS.
 - NEW 3000 ft., 2 stage Air Comp. and Motor.
- Send us your inquiries—Sand Pumps, Motors, Contractors' Equipment, etc.

ROSS POWER EQUIP. CO.
Indianapolis, Ind.

FOR SALE

New Equipment. No. 10 Williams Deck Sweeper Steam Jacketed Pulverizer, \$3500.00. No. 24 American Ring Roll Pulverizer, \$1400.00. HUMMER 6 ft. Single Surface Screen, \$1200.00. No. 2 Mitchell Electric Vibrating Screen, \$1000.00.

CHARLES EARL CURRIE & CO.
Ashland, Alabama

FOR SALE

- 1—36" American Pulverizer.
- 1—1 yard (new) Reiser clam shell bucket.

Acme Brick Co., Milwaukee, Wis.

FOR SALE

One piece new Goodyear Conveyor Belt, 47 ft. long, 40 in. wide, 6 ply, \$5.00 per lin. ft., with $\frac{1}{8}$ -in. Rubber Cover on carrying side. This belt is being sold at this price on account of being the wrong size for our use.

DOOLEY BROTHERS

Peoria, Illinois

Crushing and Pulverizing Equipment

- 1—No. 8 Gates Gyratory Crusher.
- 6—Blake Type Jaw Crushers.
- 1—42" Fuller Mill.
- 2—No. 3 Williams Universal Mills.
- 6—Sets Cornish Geared Crushing Rolls. Elevators and Conveyors.

THE MACHINERY & SUPPLY CORPORATION

Joplin, Missouri

FOR SALE

2—5'6"x20' Schmidt Tube Mills complete.
For full particulars address

Phoenix Portland Cement Company,
Nazareth, Pa.

WANTED

Any quantity of rubber belts. Sizes from 20" to 24" 5 or 6 ply; also carriers for 20" or 24" belts.

Beloit Sand & Gravel Co.
521 Ashton Bldg. Rockford, Ill.

Have you a plant for sale? Do you wish to purchase a plant? Are you in need of a superintendent or manager? Are you looking for a position as plant superintendent or manager? Advertise your wants in these columns for quick results.

When writing advertisers please mention ROCK PRODUCTS

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Rates for advertising in the Used Equipment Department: \$2.50 per column inch per insertion. Minimum charge, \$2.50. Please send check with your order. These ads must be paid in advance of insertion.

WANTED AT ONCE

One primary crusher, gyratory or jaw, average output seventy to one hundred tons per hour; one secondary crusher, thirty to forty tons per hour; also elevators, screens, etc.; two eighteen ton dinkeys, thirty-six inch gauge; twelve four yard dump cars, thirty-six inch gauge. Write full particulars at once to the

Whiting Turner Construction Co.
Stewart Building Baltimore, Md.

FOR SALE

Ohio Locomotive Crane

8 wheel type, 50' boom, new boiler. Handles one yard clam shell. For quick sale, \$8500.00. Bargain.

GRAND RAPIDS GRAVEL CO.
Grand Rapids, Mich.

FOR SALE

1-6B Crusher. Following parts have been used only 4 months: 2 arm spider, 2 eccentric, full set concaves, smooth bell. This crusher is complete in every respect with exception of base casting, which is broken. The machine is particularly adapted for hard rock crushing or limestone. Full equipment can be purchased for less than cost of parts above mentioned. Address

Silica Products Company
4500 Euclid Avenue Cleveland, Ohio

WISH TO BUY

One Ingersoll Rand 9x14" Air Compressor. Rating 140 cu. ft. per minute. Electric driven.

BUFFALO CEMENT CO., LTD.
110 Franklin St., Buffalo, N. Y.

FOR SALE

Bucyrus Steam Shovel No. 1666 Model 70C. Price \$10,000.00.

Marion Steam Shovel No. 3158 Model 28. Price \$5,200.00.

Marion Steam Shovel No. 3573 Model 28. Price \$5,500.00.

All regular specifications complete. First class working conditions. Operating continually and can be seen in operation. Prices f.o.b. cars Mexico, Mo., and subject to prior sale.

A. P. Green Fire Brick Co.
MEXICO, MISSOURI

New-RAILS-Relaying

All sections on hand for quick shipment. Reasonable prices quoted. Our stock is very complete.

M. K. FRANK
Frick Building Pittsburgh, Pa.

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Situations Wanted

POSITION WANTED

Superintendent of portland cement plant; 20 years' experience in manufacture of portland cement, past 15 years superintendent, master-mechanic. Furnish A-1 reference. Open for position May 1st.

Box 300 Care of Rock Products

POSITION WANTED

By a practical cement superintendent; 15 years' experience. Also familiar and experienced with all quarry operations and construction work. Can furnish A No. 1 reference.

Address Box 1481, Care of Rock Products

SUPERINTENDENT

With 16 years' experience in mine and quarry work. Have designed and supervised the erection of large crushing plants. Thoroughly familiar with operation of churn drills and blasting. Competent with steam shovels.

Box 1479 Care of Rock Products

Situations Wanted

Experienced Quarry Operator

Is desirous of getting in touch with financial parties with object of opening stone crushing plant in locality where large business is assured. Can guarantee success. Address

Box 1471 Care of Rock Products

POSITION WANTED

Superintendent desires engagement where thorough knowledge of steam shovel operation, transportation, heavy blasting and operation in detail are essential to production. Excellent reference. Address

Box 1472 Care of Rock Products

Help Wanted

Wanted—Sales Engineer

For our Crusher and Quarry Equipment Department and to work from Chicago office.

Austin Mfg. Company
910 S. Michigan Ave., Chicago

Plants for Sale

Want to Sell or Join in Developing

a sand and gravel bed that I own on the R. R., with two large cities within 75 miles of the property, where I own a large deposit of good, clean, coarse sand and gravel, with plenty of water and a good gas well and 3 to 4 foot seam of good clean coal right at the sand bed where I can furnish the cheapest power and fuel that can be gotten for manufacturing purposes. For further particulars address

E. M. A. Care of Rock Products

FOR SALE

Millions of tons of tailings or limestone gravel—a by-product of the zinc mines. Immediate delivery at rate of ten cars per day.

B. P. Larkin, Agent, Benton, Wis.

FOR SALE

Stone quarry located Central New York. Made good profit 1921. Plenty of business for the coming year. Owners in other lines. Will stand investigation. Address

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PERFORATED SCREENS



We have the technical knowledge and the equipment that enables us to meet your most exacting needs quickly.

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1200 27th Ave.
MILWAUKEE, WIS.

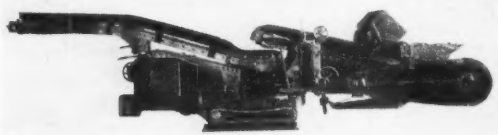
THEY'RE SELF-PROPELLED

**MYERS
WHALEY
SHOVELS**

There's no need of pushing or pulling a Myers-Whaley Shovel around. It is self-propelled, adaptable to any gauge track, and loads at the rate of one ton a minute.

Send for catalog

MYERS WHALEY CO., Knoxville, Tenn.



The House of Dependable Service HYMAN-MICHAELS COMPANY

Peoples Gas Building

CHICAGO

NEW AND RELAYING RAILS

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Bldg.

BRANCH OFFICES
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1313 1st National
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St. Louis, Mo.
2115 Railway Ex-
change Bldg.

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Skip cars for steep inclines, of various designs to meet special requirements. For twenty-five years we have been making all kinds of industrial cars satisfactorily.

Let us help you



EASTON CAR & CONST'N CO.
49 Dey Street, New York
Boston Chicago Detroit Works: Easton, Pa.
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"Hercules Solid Weld" Steam Shovel Chains



Best In the World. Will Actually Wear Out

The Columbus McKinnon Chain Company
Columbus, Ohio

SCREENS of All Kinds



Chicago Perforating Co.

2445 West 24th Place

Tel. Canal 1459

CHICAGO, ILL.

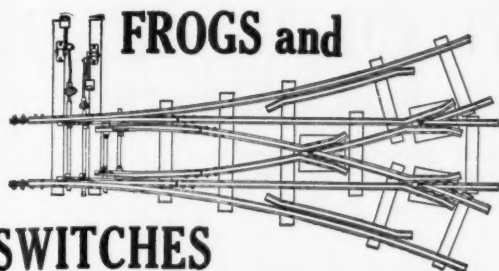


The Baldwin Locomotive Works Philadelphia, Pa.

**Steam and Gasoline
LOCOMOTIVES**

— for —
Industrial Service

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FROGS and SWITCHES

The Central Frog & Switch Co., Cincinnati, O.
Frogs, Switches, Crossings, Switch Stands, Rails, Angle Bars, Fishplates, Throws, Rail Braces, Tie Plates, Portable Track, Etc., Etc.

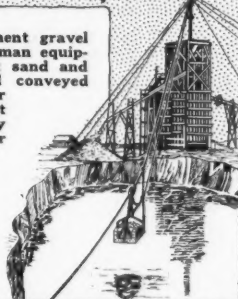
SAUERMAN DRAGLINE CABLEWAY EXCAVATORS

dig, convey, elevate and dump in one operation

Cost data furnished by prominent gravel producers who are using Sauerman equipment backs up our claim that sand and gravel can be excavated and conveyed from pit to plant by one of our drag-line cableway excavators at a lower cost per ton than by using any other equipment or combination of equipment.

Write for Catalog No. 7

Sauerman Bros.
1140 Monadnock Bldg.
Chicago
Also Mfrs. of Power Scrapers



ARNOLD & WEIGEL

CONTRACTORS AND ENGINEERS
WOODVILLE, OHIO

Specializing in

The Design of Modern Lime
Calcining and Hydrating Plants

WHY?—WOOD DRILLS

Because They—

Drill faster
Stand more abuse
Need less repairs
Thrive on hard work

Men who know, prefer "WOOD DRILLS"
Because they fill the bill and cut the cost.

Wood Drill Works

30-36 Dale Ave.

Paterson, N. J.

TERRY FULL CIRCLE CRANES



FULL CIRCLE CRANES.

"EQUIPMENT THAT LASTS."

TIMBER & STEEL DERRICKS.

LET US SOLVE YOUR MATERIAL HANDLING PROBLEMS.

Steel and Timber **TERRY**
DERRICKS

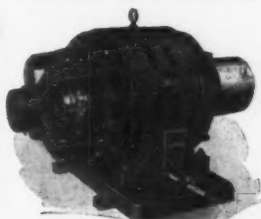
PERFORATED SCREENS AND STEEL PLATE WORK

W. Toepfer & Sons Co.
Milwaukee Wisconsin

BACON-FARREL ORE & ROCK CRUSHING-WORLD KNOWN ROLLS-CRUSHERS

EARLE C. BACON, INC. ENGINEERS
26 CORTLANDT ST., NEW YORK

Electric Motors



Large Stock of New
and Used

Motors and
Generators

Repairs for Any Make
or Type

Sorgel Electric Co., Milwaukee, Wis.

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J. C. BUCKBEE COMPANY

ENGINEERS

BUILDERS OF CEMENT PLANTS

FIRST NATIONAL BANK BUILDING
CHICAGO, U. S. A.



ALDEN, WILTERDING & SCOTT
CONSULTING ENGINEERS

Seven-Sixty Spitzer Building
TOLEDO OHIO

COMPLETE DESIGNS

Sand and Gravel Plants, Stone Crushing Plants, Conveying and Storage Systems. Hydraulic Dredging and Stripping Plants. Power Plants and Electric Transmission.

WRITE FOR OUR CAR LOADING CHART

We Design and Equip Complete Plants

for the manufacture of gypsum products, such as wall plaster, moulding plaster, wall board products, gypsum block products, also mixing plants.

We are prepared to furnish complete machinery-equipment and design and furnish plans for the installation. Consult our Engineering Department. Forty years' experience in designing of wall plaster machinery and plants.

The J. B. Ehrsam & Sons Mfg. Co.

Engineers, Machinists and Founders
Enterprise, Kansas

Robert W. Hunt Jno. J. Cone Jas. C. Hallsted D. W. McNaugher

ROBERT W. HUNT & Co.

Inspection—Tests—Consultation

Inspection New and Second Hand Machinery, Pumps, Crushers, Steam Shovels, Cars, Locomotives, Rails and Quarry and Contractors' Equipment

INSPECTION AND TESTS OF SAND, GRAVEL, CEMENT, STRUCTURAL STEEL, CASTINGS AND CONSTRUCTION MATERIALS

Cement, Chemical and Physical Testing Laboratories

CHICAGO
New York St. Louis Kansas City Cincinnati Pittsburgh San Francisco

James N. Hatch, C.E., M.E.

Member A. S. C. E.

CONSULTING ENGINEER
500 Old Colony Bldg., Chicago

Designs and Constructs

Complete Sand and Gravel Screening and Washing Plants.
Stone Crushing and Storage Plants. Conveying Systems.
Contractors' Material Plants

Electric Generating Plants and Transmission Lines.
Estimates and Plans Furnished

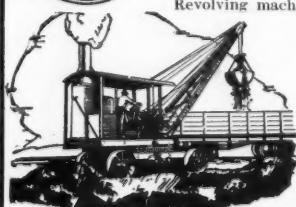


Byers Cranes Keep Faith

Byers has spent nearly 40 years building Cranes and Hoists. Over a thousand installations—steady, efficient performance—scores of "repeat" orders. We build the "Auto-Crane" and Full-Revolution machines—Byers equipment serves almost every industry. Tell us about your work—we'll describe the machine to handle it, and will quote.

THE BYERS
MACHINE COMPANY
310 Sycamore St., RAVENNA, OHIO

Sales Representatives
in 25 Leading Cities



When in the market for machinery or equipment, look through the advertisements of ROCK PRODUCTS. If you do not find what you want advertised in this issue, write us and we will put you in touch with reliable firms who can supply your need. This service is free to our reader. Use it.

Rock Products

The Nation's Business Magazine of the
Rock Products Industry

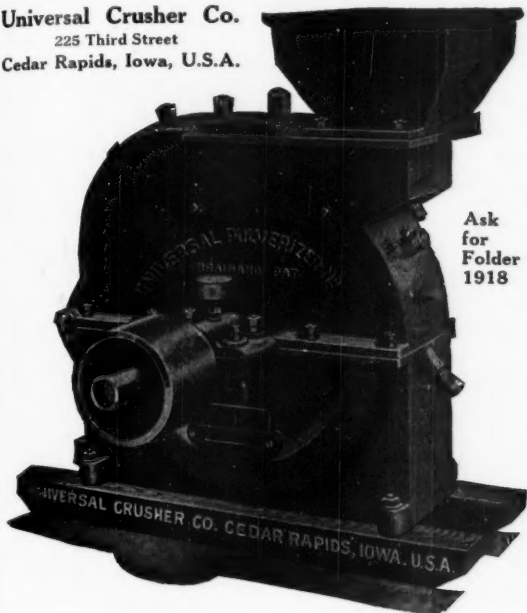
542 So. Dearborn St. Chicago, Illinois

When writing advertisers please mention ROCK PRODUCTS

Universal Crushers

The biggest value for your money. Universal crushers and pulverizers reduce stone to desired size or fineness in a jiffy! Fifteen years of designing and building experience have made possible the exceptional ability of Universals.

Universal Crusher Co.
225 Third Street
Cedar Rapids, Iowa, U.S.A.



Ask
for
Folder
1918



PORTER LOCOMOTIVES

Built right—they work
right—give long service
with a remarkable free-
dom from repairs.

H. K. PORTER COMPANY
PITTSBURGH, PA.



PERFORATED STEEL SCREENS

The success of any house supplying repair and renewal parts depends on furnishing what is needed quickly and correctly, and of satisfactory quality.

Sixteen years in the Perforated Metal field have given us the experience, equipment and technical knowledge, and three hundred tons or more of Steel Plates and Sheets enable us to fill rush orders promptly.

Try us with your next order.

Cross Engineering Company, Offices and Works, Carbonade, Pennsylvania

By the very nature of the work

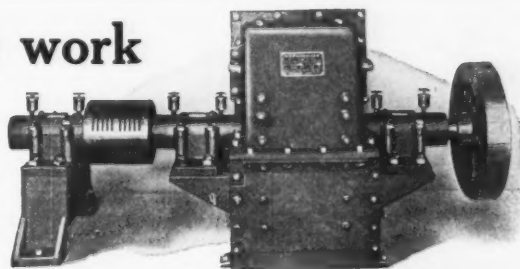
it is called upon to perform a pulverizer must be much stronger than the material it handles.

Only STEEL will stand the stress
"K-B" is built ALL-Steel

Catalog with full particulars on request

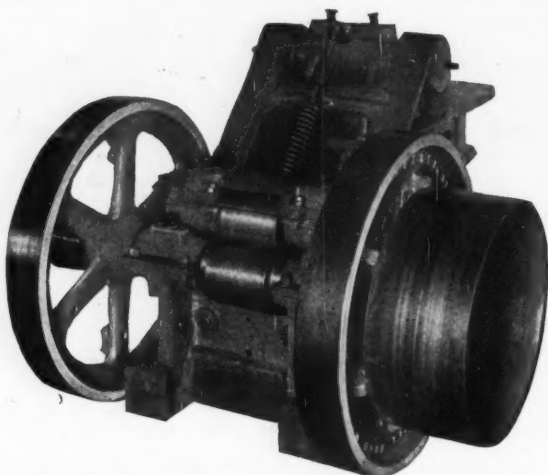
K-B PULVERIZER COMPANY, Inc.,

92 Lafayette St.
NEW YORK



K-B
PULVERIZER

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Reliance Crushers

IN ALL SIZES FOR EITHER PORTABLE PLANTS FOR ROAD BUILDING OR STATIONARY QUARRY INSTALLATIONS.

BUILT FOR LONG, HARD SERVICE—WILL SAVE YOU MONEY IN THE LONG RUN

Let us quote you prices

Universal Road Machinery Co., Kingston, N. Y.

Branches in all principal cities in U. S. and Canada
MANUFACTURERS OF THE FAMOUS RELIANCE LINE
OF ROAD BUILDING AND QUARRY EQUIPMENT

Note These Please!

Points of superior merit guarantee economical operation of the Fuller Lehigh

PULVERIZER MILL

They are unequalled for producing

Agricultural Limestone

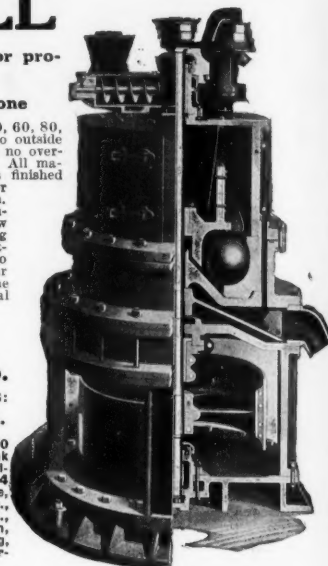
Reduces lump rock to 20, 40, 60, 80, 100 or 200 mesh. Requires no outside accessory equipment. Requires no overhead shafts, drives or screens. All material discharged from mill is finished product. No inside journals or bearings. No inside lubrication. Uniform feeding system. Constant and free discharge. Low installation cost. Low operating cost. Low lubricating cost. Dustless operation. Built in sizes to meet the requirements of your trade. Grinds rock to meet the specifications of all Agricultural Experiment Stations.

Send for Catalog No. 70

Fuller-Lehigh Co.

MAIN OFFICE AND WORKS:
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Branches: New York City, 50 Church St. First National Bank Bldg., Parsons, Kans. 719 Sheldon Bldg., San Francisco, 714 L. C. Smith Building, Seattle, Wash. 1336 McCormick Bldg., Chicago, Ill. 25 Victoria St., Westminster, S. W. I., London, England. Germany, Hamburg, 1, "Wallhof," Glockengiesserwall, 2.



Hettrick Canvas Belting

Some of our customers call the Hettrick the greatest belting in the world—they actually mean that it is the most trustworthy, the most constant and the most dependable belting in the world.

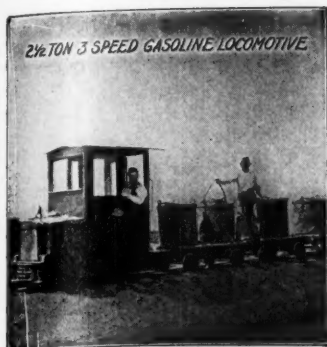
The day-in-and-day-out demands imposed on the Hettrick merely demonstrate its wonderful reliability, satisfaction and the fact that quality is built into every part of it.

Our guarantee of service carries conviction.

The Hettrick Mfg. Company, Toledo, Ohio

For prompt and satisfactory results in buying or selling a plant securing help or a position, use the Classified Department of
ROCK PRODUCTS

When writing advertisers please mention **ROCK PRODUCTS**



2 1/2-TON 3 SPEED GASOLINE LOCOMOTIVE
GEAR AND FRICTION DRIVEN
GASOLINE LOCOMOTIVES—2 1/2
TO 25 TONS ON DRIVE WHEEL

WHITCOMB LOCOMOTIVES

IT WILL PAY YOU TO GET OUR
PROPOSITION BEFORE YOU BUY

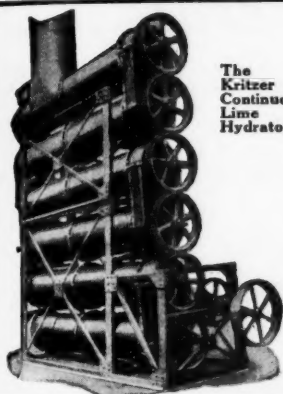
GEO. D. WHITCOMB CO.

MAIN OFFICE AND WORKS

ROCHELLE, ILLINOIS
U. S. A.



5 TON FRICTION DRIVE GASOLINE LOCOMOTIVE
STORAGE BATTERY LOCOMO-
TIVES—1 TO 8 TONS ON
DRIVE WHEELS



The
Kritzer
Continuous
Lime
Hydrator

HYDRATE

Years ago we helped our customers create a demand for their hydrate. Today the demand exceeds the supply. That's why every lime manufacturer should have an efficient, economical hydrating plant.

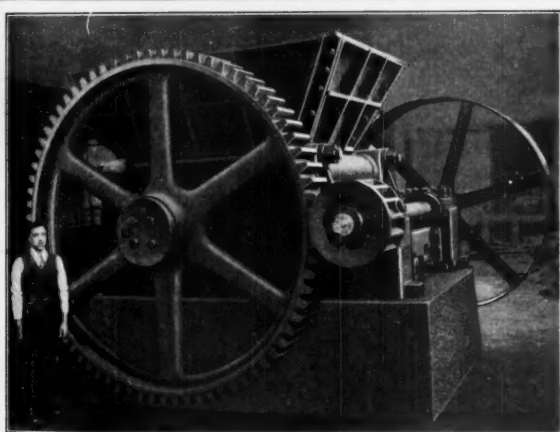
THE KRITZER Continuous Lime Hydrator is efficient in production and economical in operation and maintenance. Let us investigate exhaustively the local conditions peculiar to your proposition, and then apply our experience of many years and design a plant to meet those conditions.

*A KRITZER plant, scientifically adapted to your con-
ditions, will give you the best product at lowest cost*

THE KRITZER COMPANY

503 South Jefferson Street

CHICAGO, ILL.



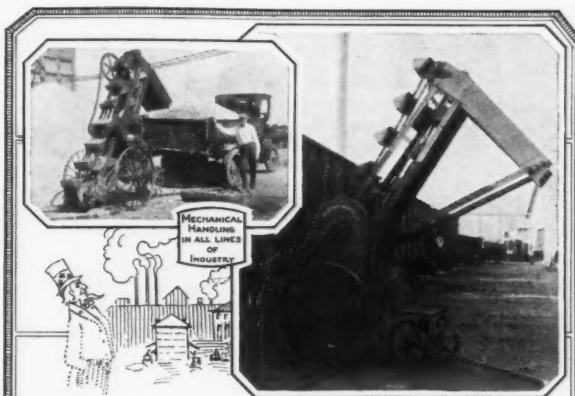
If you had seen the McLanahan Single Roll Crusher before ordering your first Gyratory or Jaw Crusher, you would now be running only the McLanahan Crushers.

After many years' practical experience building and operating other crushers, we brought out the first Single Roll Crusher, proved it best, simplest and most economical—making least fines—requires but little head room—no apron or hand feeding—takes wet or slimy material.

Capacity, 5 to 500 Tons per Hour

McLanahan-Stone Machine Co.
Hollidaysburg, Pa.

Screens, Elevators, Conveyors, Rock Washers, etc.



Wagon Loaders

GIFFORD-WOODS Wagon Loaders are proving their economical value every day in handling loose material from ground storage. They are an economic necessity when material of this kind is handled in quantity.

Let us know your problem and we will submit a money saving plan at once.

Gifford-Wood Co.

NEW YORK MAIN OFFICE AND WORKS BOSTON
CHICAGO HUDSON, N. Y. BUFFALO

The Clyde Lime Hydrator Performance Counts

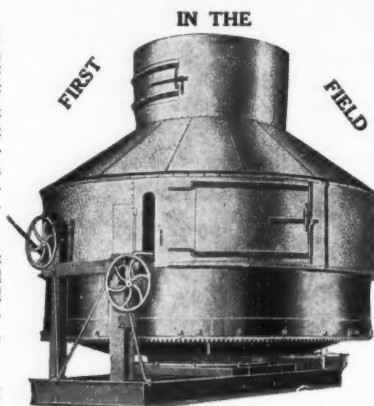
The Clyde was first in the field, and through dependable and economical performance is still first choice of lime operators.

The Clyde Hydrator produces big capacities of lime at only three-fifths the cost of any other hydrator on the market.

The Clyde not only produces over 90% of the hydrate of America, but makes the best quality of finishing lime from either high calcium or magnesium.

Simple, easiest to operate and most economical in cost of installing, maintaining, and operating.

Send for Catalog

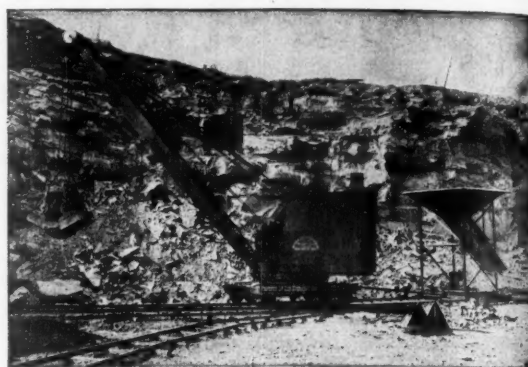


H. MISCAMPBELL

Patentee and Sole Manufacturer

DULUTH

MINNESOTA



O. S. DEPENDABLE Locomotive Cranes

reduce expense of handling materials and increase profits and output wherever installed. Catalog No. 18 now ready. Its valuable information will simplify your problems.

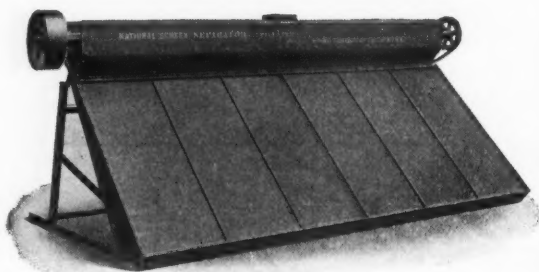
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ORTON & STEINBRENNER CO.

Chicago, Ill.

Factory—Huntington, Ind.

NATIONAL Screen Separator



The Leading Screen in

Efficiency

Durability

Simplicity

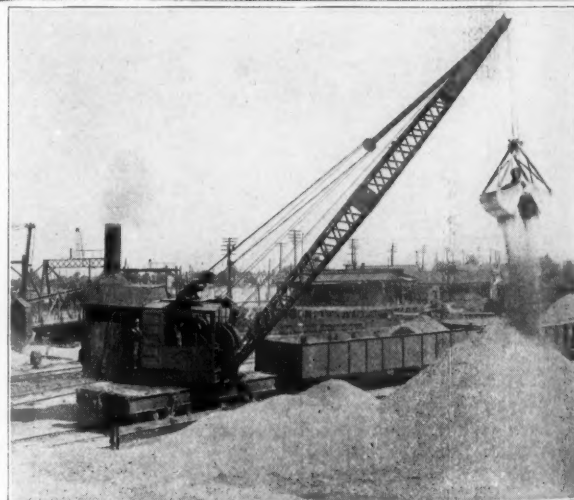
Capacity

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NATIONAL ENGINEERING COMPANY

1549 West Washington Boulevard, Chicago

LOCOMOTIVE CRANES
CLAM SHELL BUCKETS - SHIPBUILDING CRANES
CAR DUMPERS PILE DRIVERS
THE McMYLER INTERSTATE CO.
CLEVELAND OHIO



Handling Limestone With a Type "J" Locomotive Crane

This crane has proven to the satisfaction of a large number of owners that the heavier crane is the cheapest one to buy for some classes of service. The Type "J" is only one of a large number of cranes manufactured by this Company.

We also manufacture a complete line of clamshell buckets.

The McMyler Interstate Co., Cleveland, O.

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When writing advertisers please mention **ROCK PRODUCTS**

METRO NITE

for Stucco-

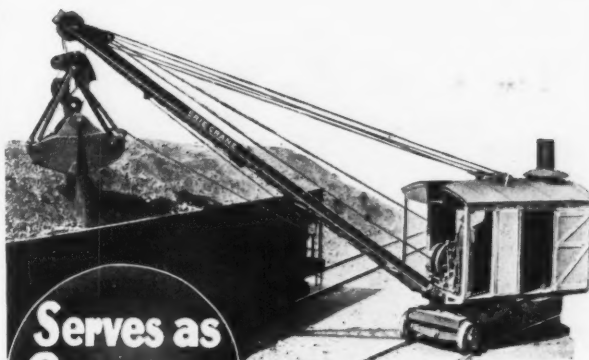
Stucco Buildings, Concrete Blocks or Bricks faced with Metro-Nite are beautiful, artistic and everlasting.

Metro-Nite White is of a crystalline character, really a siliceous dolomite. It is extremely hard, sharp and cleanly graded, making a bright, sparkling face.

Free samples mailed on request.

Two colors—White and Green.

The Metro-Nite Co.
333 Hartford Ave., Milwaukee, Wis.



Serves as Crane or Steam Shovel

Every ERIE can be quickly and easily changed over to a Locomotive Crane. Gives excellent service with clamshell bucket — excavates gravel, loads cars, handles storage, etc.

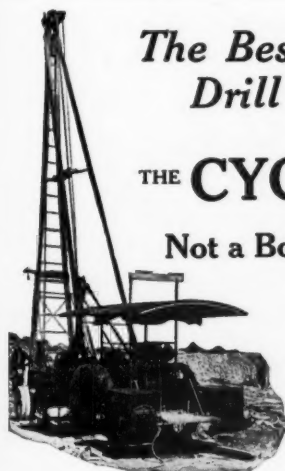
In the hardest steam shovel service, gravel producers and quarrymen have found the ERIE very sturdy and reliable. "Our first ERIE has been digging hard gravel for 3 years without any repairs. We have in the past operated other steam shovels that are good, but the ERIE is the best, being by far the most substantial" — write the Standard Builders' Supply Co., Grand Rapids, Mich. They own 2 ERIES, a Steam Shovel, and a Crane.

We will be glad to send you a bulletin showing just what you can do with the ERIE, both as crane and steam shovel. Write for Bulletin P-16.



BALL ENGINE CO., Erie, Pa., U. S. A.
Builders of ERIE Steam Shovels and Locomotive Cranes

ERIE Revolving Shovels



The Best Blast-Hole Drill on Earth

THE CYCLONE No. 14

Not a Boast—A FACT

We will prove the superiority of the No. 14 Drill by placing one of the outfits in your quarry against any or all other makes.

If the Cyclone doesn't out-drill and out-wear all other drills, we will remove it from the work without cost to you.

Our proposition gets below the paint—it eliminates talking points and evaporates hot air. It puts buying on a strictly engineering basis where it belongs.

Furnished in Steam, Gasoline, Compressed Air or Electric Power Traction or Non-Traction

Let us send you full particulars

The Sanderson-Cyclone Drill Co.
ORRVILLE, OHIO

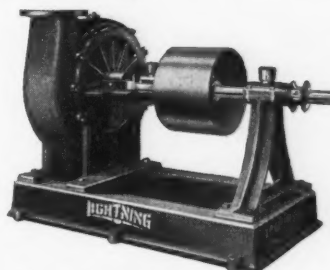
Eastern and Export Office

30 Church St., New York

The Lightning Sand Pump

Is No Loafer!

Operate like a flash! Adjusts in a flash! Parts replaced like a flash!



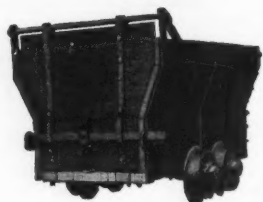
The life of the Lightning Pump is one long, unbroken streak of production.

Simple in design and construction.
Drum removable and adjustable to any position.
Drum plate quickly removable.
Ball thrust bearings, front and rear.
Chilled bumper in sand drum provides long wear.
Bumper quickly replaced.
Detailed description with prices on application.

Address Pump Dept.

Kansas City Hay Press & Tractor Co.
Kansas City, Mo.

WATT CARS



Our factory the largest in the world devoted exclusively to car building

Write today for catalog

The Watt Mining Car Wheel Co.
Barnesville, Ohio

Denver: Lindrooth, Shubart & Co., Boston Bldg.
San Francisco: N. D. Phelps, Sheldon Bldg.
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CAR PULLER

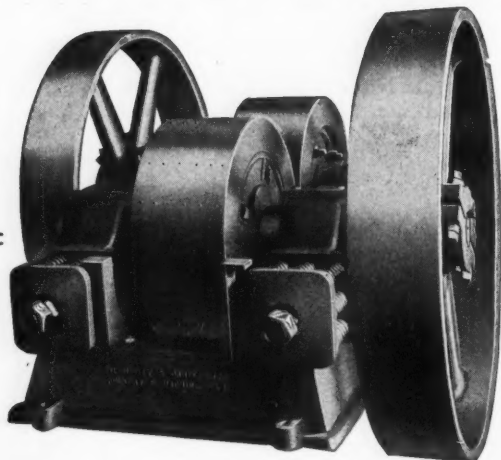
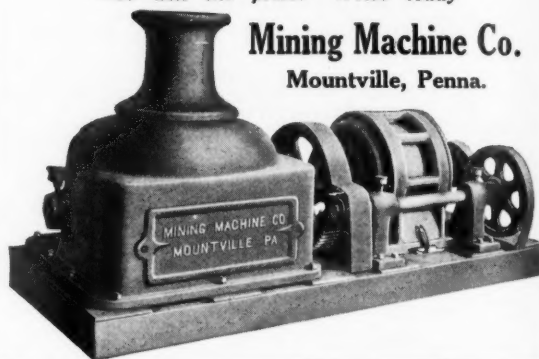
Ideal for Moving Cars Quickly and Easily

It's designed with a capstan mounted well above the motor drive, so that a pull can be taken from any position. Its comparatively low rope speed and powerful gear ratio enable it to move heavy or light cars quickly and easily.

Metal cover for both motor and gear drives, when installed in the open.

*The complete story will interest you
—so will the price. Write today*

Mining Machine Co.
Mountville, Penna.



When you are in the market for Transmission Equipment, Screens, Elevator Buckets or Crushers, and want the best that can be had irrespective of price.

Write for Descriptive Literature

**WEBB CITY & CARTERVILLE
FOUNDRY & MACHINE WORKS**
WEBB CITY, MISSOURI

Many Notable Improvements Characterize

THE

**"American"
Gearless
Blast-
Hole Drill**



While the normal speed of drilling is 50 strokes a minute, this machine will jump the tools smoothly at 60 strokes, handling with ease a 4-in. diameter by 20-ft. length drill stem equipped with bit and socket weighing from 1100 to 1200 lbs. and drilling 5 1/2-in. or 6-in. holes.

The spudding beam is attached to the crank in such manner that it gives a quick, hard stroke of drill at a speed of 50 or 60 r. p. m., with a minimum of whipping of cable.

No clutches on the machine; the crank is keyed fast to the crank shaft, and the tools are always the full length of the stroke off the bottom when stopping, permitting them to start on the down stroke with engine or motor at full speed without backing up.

Description on Request

The American Well Works Aurora, Illinois

KENNEDY GEARLESS CRUSHER

for crushing rock-breaker feed to $\frac{3}{4}$ -in. product or finer, in one break—a machine of unusually high capacity.

Jaw crushers, with their restricted discharge area, and standard gyratories, with their low speed geared drive, are not adapted to fine crushing with efficiency.

Kennedy-Van Saun met an urgent demand in designing and manufacturing the Kennedy Gearless Crusher—a rope or belt driven high-speed gyratory for large tonnage fine crushing at low power cost and maintenance.

You will be interested in the Kennedy Gearless Crusher with the Kennedy ball and socket self-aligning eccentric—it is fully described in Bulletin 2; send for your copy today.

SPECIFY **KVS** PRODUCTS

KENNEDY-VAN SAUN

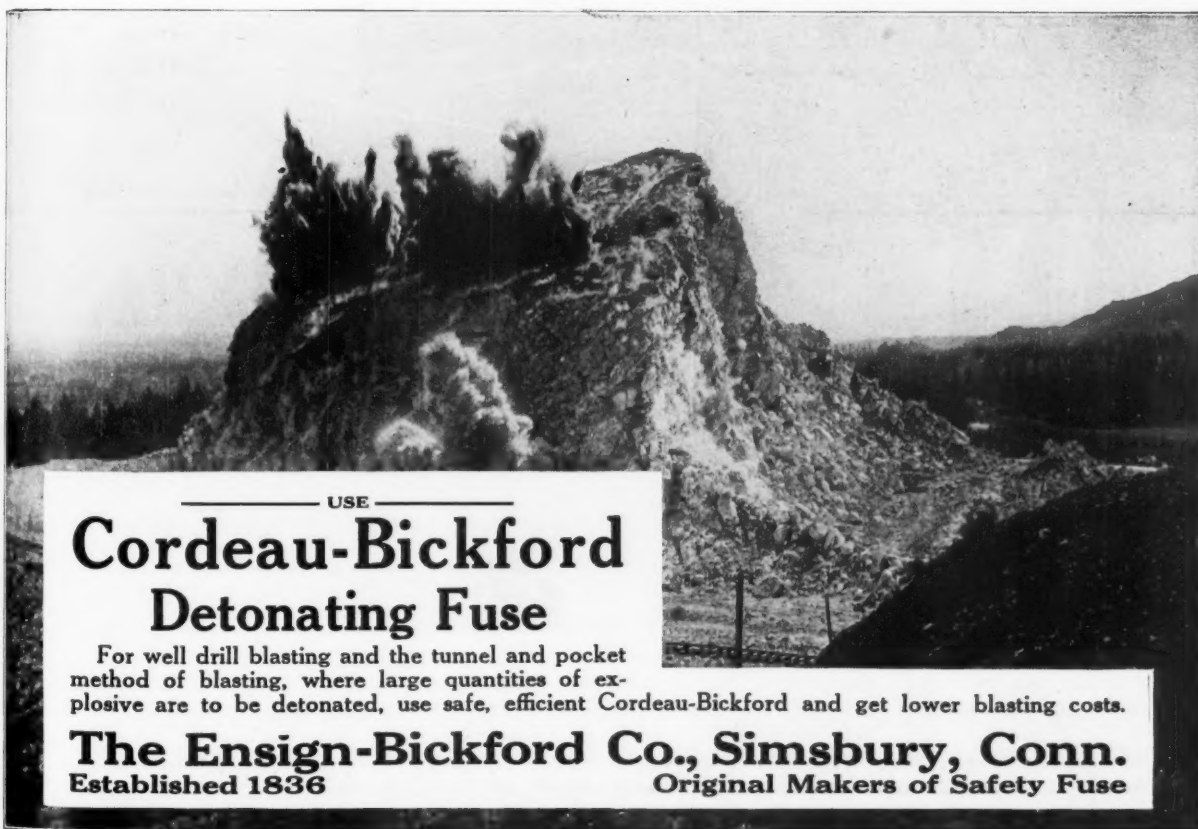
Mfg. and Eng. Corporation

120 Broadway, New York, U. S. A.

Paris Agents: Compagnie des Entreprises Industrielles, 40, Rue des Mathurins, Paris, France



One of the
K. V. S. Products

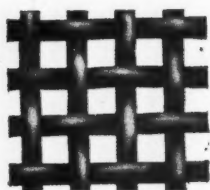


— USE —

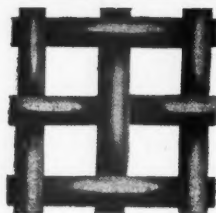
Cordeau-Bickford Detonating Fuse

For well drill blasting and the tunnel and pocket method of blasting, where large quantities of explosive are to be detonated, use safe, efficient Cordeau-Bickford and get lower blasting costs.

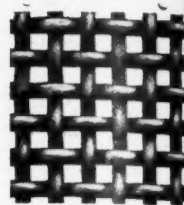
The Ensign-Bickford Co., Simsbury, Conn.
Established 1836 Original Makers of Safety Fuse



3 1/4" Mesh; .135 Wire



2" Mesh; .192 Wire



5" Mesh; .105 Wire

"CLEVELAND" DOUBLE CRIMPED WIRE CLOTH

The steady increase of "Cleveland" Double Crimped Wire Cloth in service is due, when completely analyzed, to the ability of this product to win and keep friends. This sort of good will can be won only by a product of real merit, and, in this case, it is the uniform fineness of "Cleveland" Double Crimped Wire Cloth that makes it unequalled for the screening of Sand, Gravel, Crushed Stone and Cement.

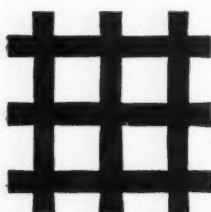
"Service" is the definite policy of this organization, and through every phase of manufacture this end is constantly before us.

A large stock always on hand—special meshes made to suit requirements. **Prices Right.**

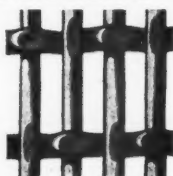
THE CLEVELAND WIRE CLOTH AND MANUFACTURING COMPANY

3573 East 78th St.

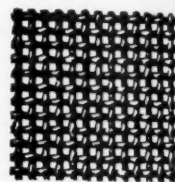
Cleveland, Ohio



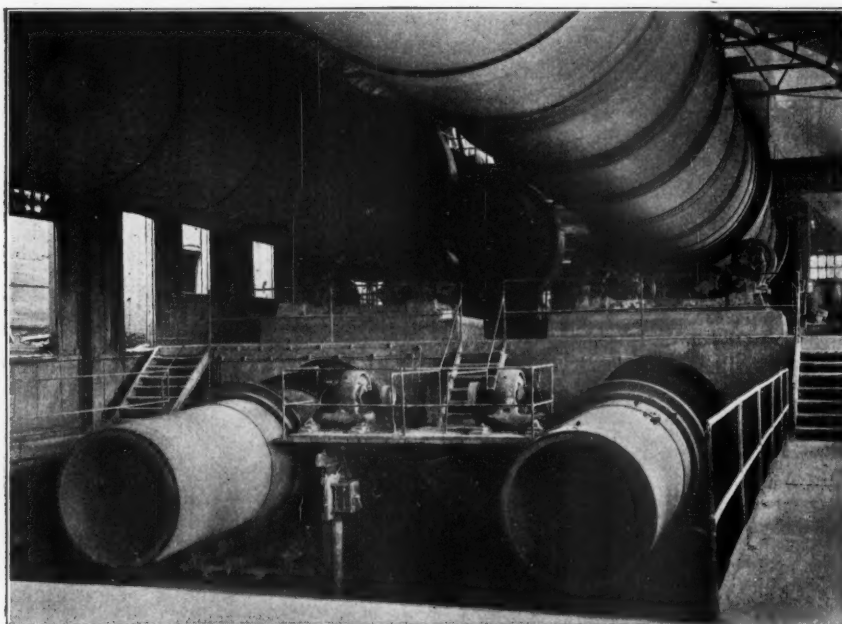
2 1/2" Mesh; .105 Wire



No. 23—Rolled Slot



1 1/2" Mesh; .047 Wire



10'x175' KILNS AND ROTARY COOLERS

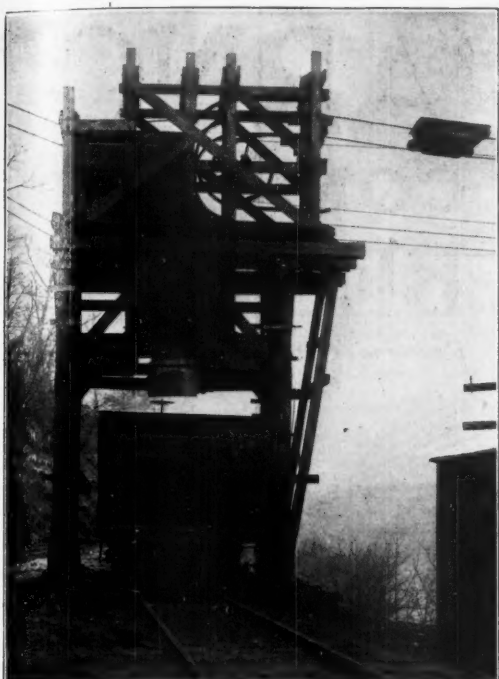
Typical
Illustration
of Design
AND
Construction
OF
KILNS
AND
COOLERS
FOR
MODERN
CEMENT PLANTS

BULLETIN 1457
AT YOUR REQUEST

ALLIS-CHALMERS

MILWAUKEE, WIS. U. S. A.

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With such equipment operators of mines and quarries are moving thousands of tons daily

Break Jail! Why Be a Prisoner to High Production Costs

when the

AUTOMATIC AERIAL TRAMWAY

will serve as a means of reducing expenses and enable you to meet competition?

**More Tons Moved
Less Labor Required**

**Man Power Is Waste Where Machinery
Will Do the Work**

Let Us Solve Your Problem

Write Us for Photographs and Description

Interstate Equipment Corporation
25 Church Street New York City

Grit-Proof

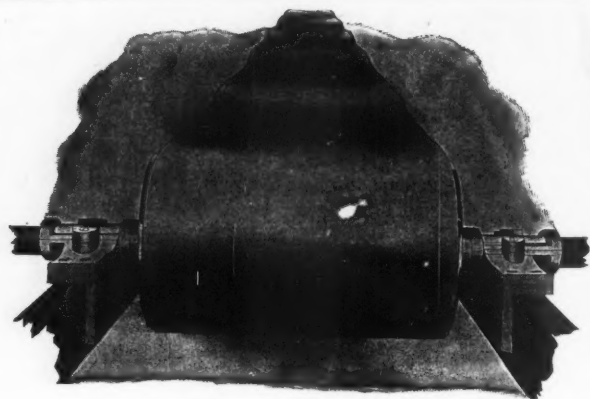
When handling gritty materials such as sand and gravel, it is a fact of common knowledge that any unprotected bearing, if lubricated, attracts grit and wears out faster than if no lubricant is used.

OWEN BUCKET

bearings are (1) protected and (2) lubricated. They do not come in contact with the material being handled, and the Owen gravity-feed method of lubrication automatically keeps them clean at all times. This and other dollar-saving features of the new Owen Sand and Gravel Buckets will interest you.

The Owen Bucket Co.
438 Kirby Bldg., Cleveland, Ohio

When writing advertisers please mention ROCK PRODUCTS



“ARNO”

CONVEYOR BELTING

*Reduces Your Cost of Handling
to a Minimum*

Arno Conveyor Belts are manufactured to render unusually long and satisfactory service.

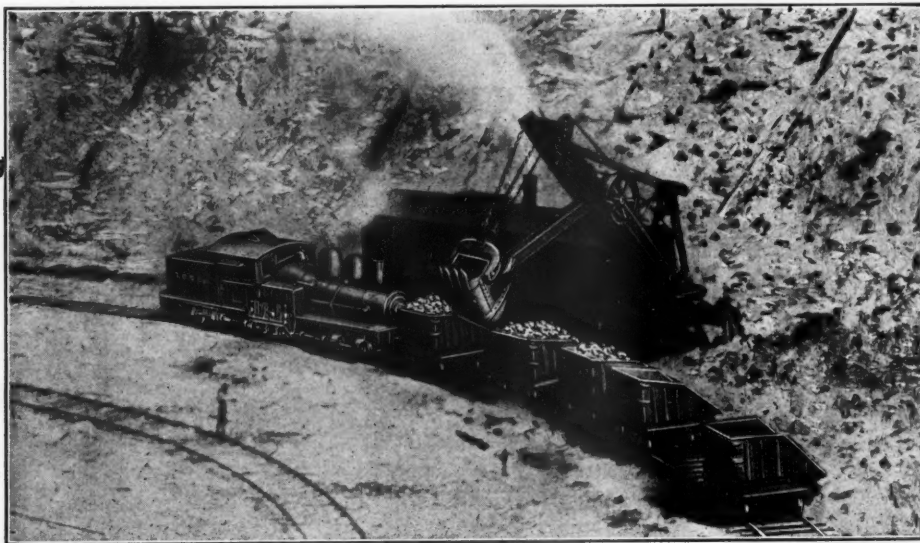
Made of a combination of duck, friction and extra cover stock, they are especially constructed for carrying ores, broken stone, sand, gravel, etc.

Write for Catalog and Information

CINCINNATI RUBBER MANUFACTURING CO.

Makers of Belting—Hose—Packings and Molded Specialties

CINCINNATI, OHIO, U. S. A.



“SHAYS”

Give Continuous Service

In rock crusher service “Shay” locomotives are far ahead of rod engines.

They have fewer exposed wearing parts that dust and dirt will cut.

They are cheaper to maintain because you can

easily replace any part without dismantling the engine.

“Shay” locomotives do more work per day than rod engines can do and cost less to operate and maintain.

We know, because we build both.

Lima Locomotive Works, Inc., Lima, Ohio, 30 Church St., New York

When writing advertisers please mention ROCK PRODUCTS

REDUCE YOUR OPERATING COSTS

By Using

THE ARMSTRONG BLAST HOLE DRILL

Don't use Manila Cable. Steel Cable can be used efficiently with the "Armstrong Patent Wire Line Derrick."

We guarantee the "Wire Line Derrick" to operate successfully, absorb the shock of the drilling motion and increase the speed.

Write for full particulars

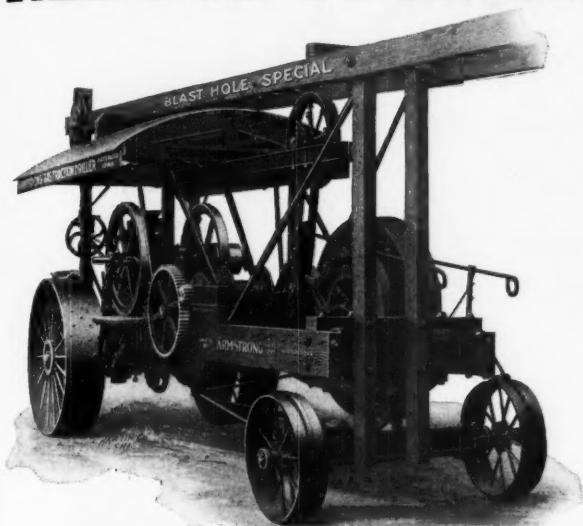
Armstrong Mfg. Company
Dept. A Waterloo, Iowa

BRANCH OFFICES

Ft. Worth, Texas, 229 West 15th St. Scottsville, Kentucky
Baxter Springs, Kans. New York, 30 Church St. (Export Office)

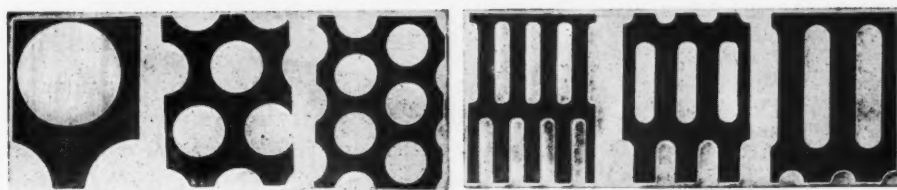
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Collins-Ferguson Co. Seattle-Portland
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Armstrong
BLAST HOLE DRILLS
BUILT FOR SERVICE SINCE 1867

PERFORATED METALS



All sizes and shapes of holes

For Screening Stone, Gravel, Sand, Cement and all Minerals

FOR YOU—a warehouse filled with sheets and plates of Steel and other metals. Vaults crowded with costly dies for making innumerable sizes and shapes of holes in these sheets, for You.

Perforating is our specialty and our work is well done. Excellent facilities and efficient labor permit us to offer you the highest grade of workmanship at economical prices.

THE HARRINGTON & KING PERFORATING CO.

New York Office
114 Liberty St.

621 North Union Ave., Chicago, Ill., U. S. A.

When writing advertisers please mention ROCK PRODUCTS

In low power per ton, low maintenance cost and superiority of product produced, Raymond Pulverizers with Air Separation outstrip any other type of equipment for handling Hydrated Lime.

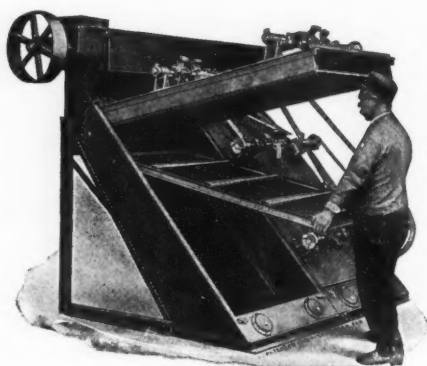


RAYMOND BROS. IMPACT PULVERIZER CO.
1301 North Branch Street Chicago, Ill.

Western Office: 201 Boston Bldg., Denver, Colo.
Eastern Office: 5th Floor, Grand Central Palace, New York City



STURTEVANT "ONE - MAN ONE - MINUTE" "OPEN-DOOR" MACHINERY



STYLE "M" SUPER SCREEN

The Super-Screen not only screens everything screenable with a range of 4 to 160 mesh, giving from one to four products from one machine, but is of Sectional, or Unit, "Open Door" construction with all parts interchangeable and of such small size that one man can handle them easily and quickly. Add sufficient number of Units to secure output wanted.

You see one man opens the door, removes the screen frames, both scalper and fine screens, and tightens the cloth—all through the open door. A one man proposition throughout—no time or labor wasted. Keep the screen in perfect condition for maximum output.

STURTEVANT MILL CO., BOSTON MASS.

BOSTON: HARRISON SQ.

NEW YORK: SINGER BLDG.

CHICAGO: PEOPLES GAS BLDG.

ATLANTA: HEALEY BLDG.

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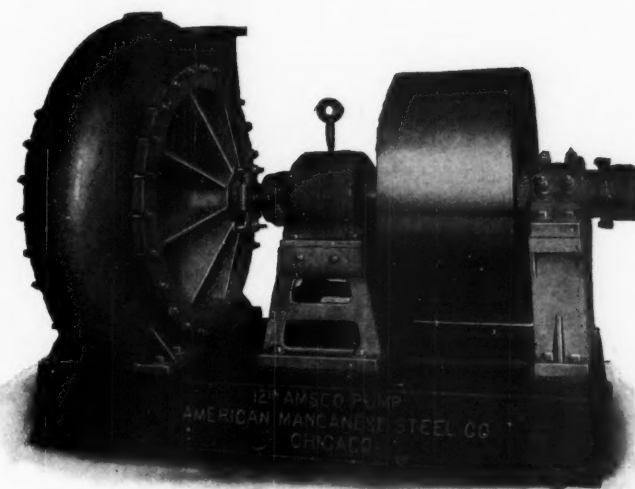
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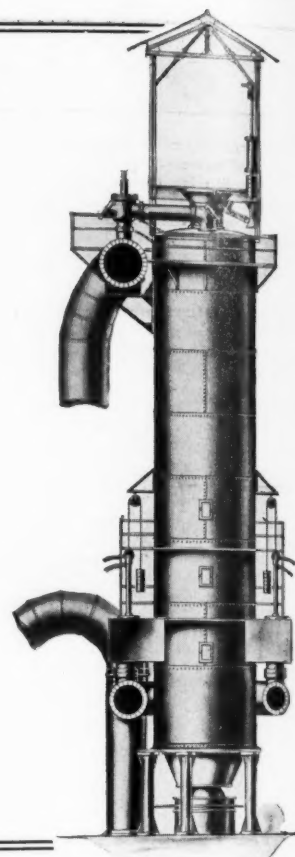
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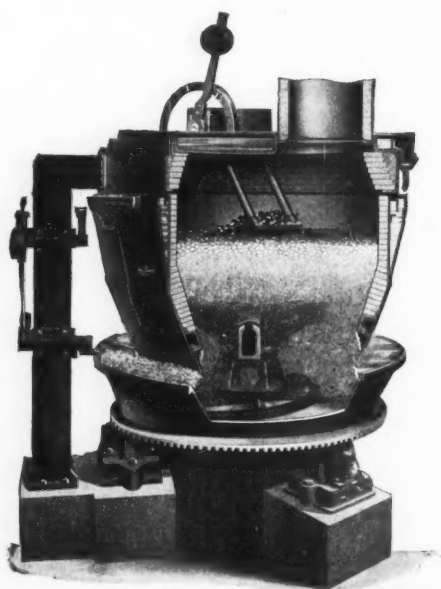
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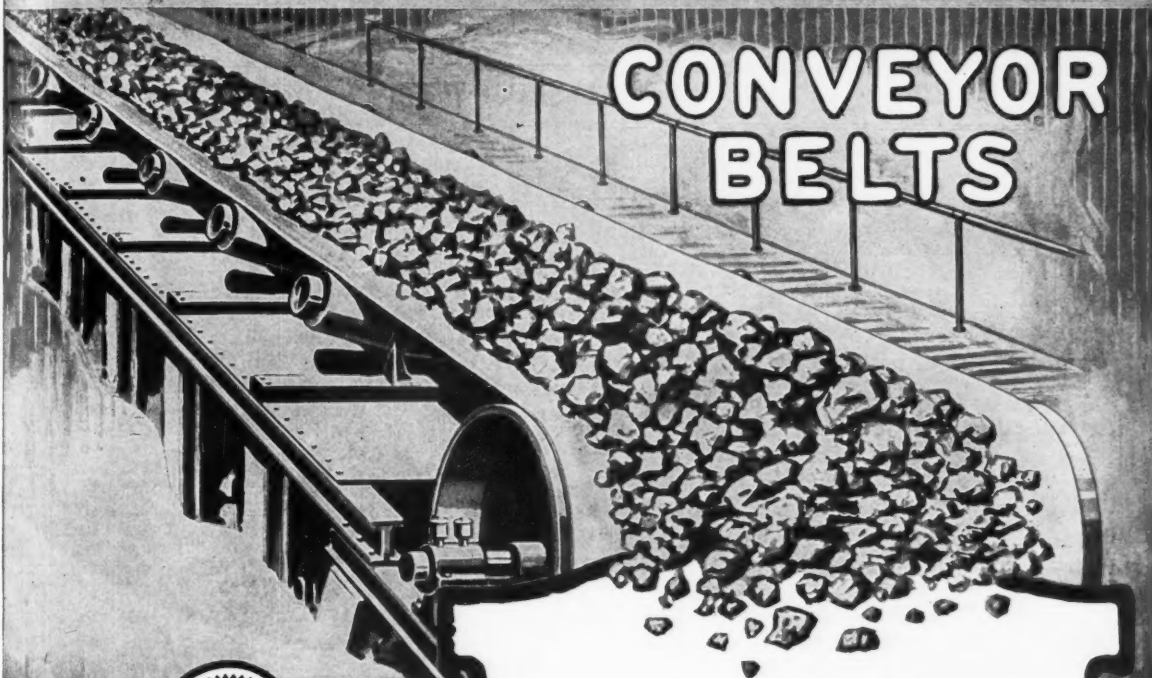
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